Best Practices in Presenting Data and Information

NEAIR 2010 Summer Drive-In Workshop

Terra Schehr

Assistant Vice President for Institutional Research and Effectiveness

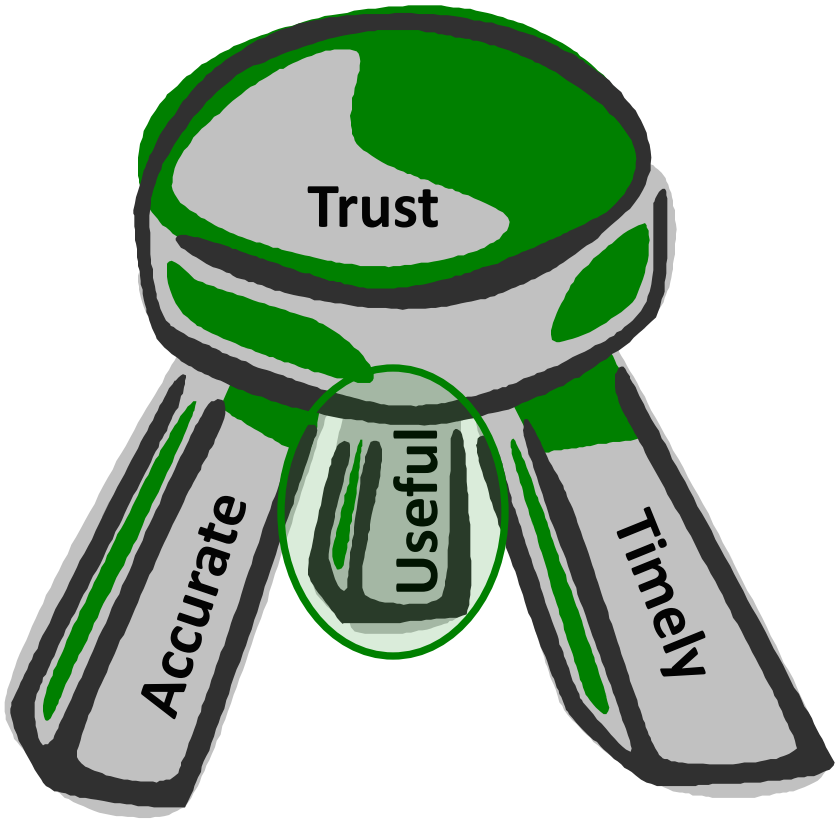
Loyola University Maryland

Agenda

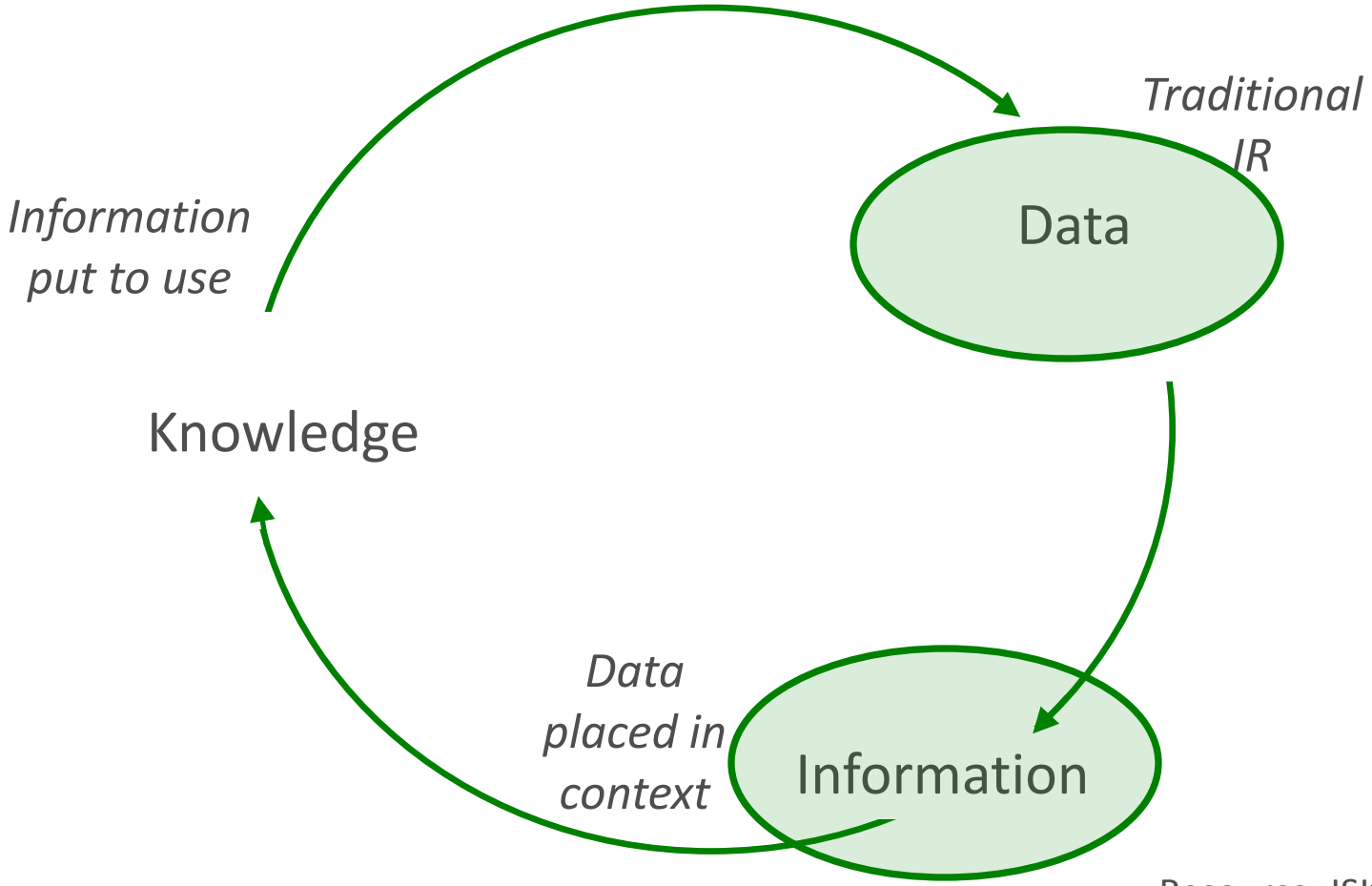
- **Underlying philosophy**
- **Sectors/audiences**
- **Deliverables (Word, PPT, Excel, PDF . . .)**
- **Tables, charts, and supergraphics**
- **What is the point?**

Underlying Philosophy

What we are known for



Knowledge Management



Approaching the Data

- **3 Rs**
  - Reduce
  - Reuse
  - Recycle
- **What kind of cop are you going to be?**
  - Joe Friday
  - Vic Mackey
  - ?

Small group activity

What do you wonder/worry about when preparing/ presenting data?

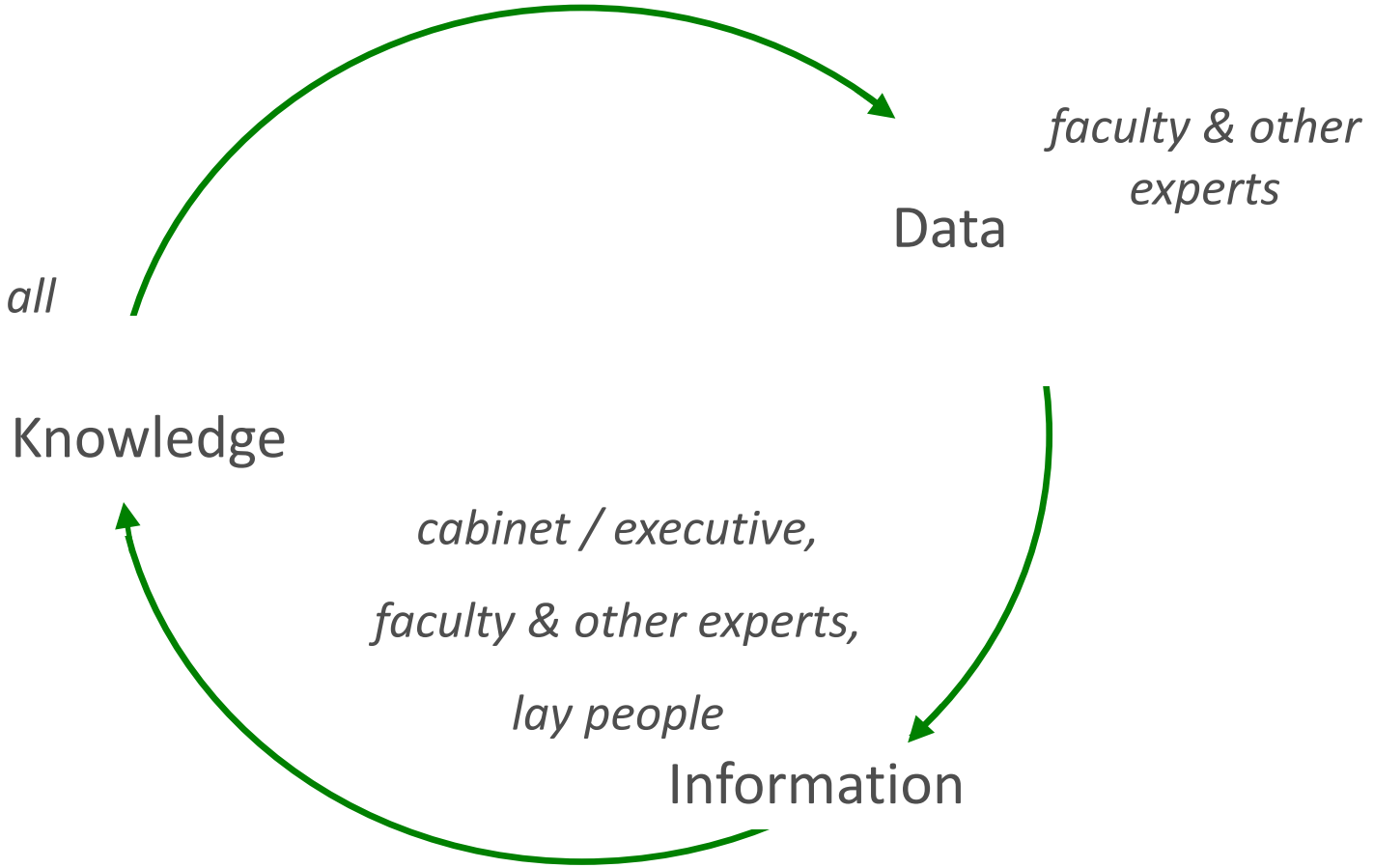
Sectors and audiences

Audiences

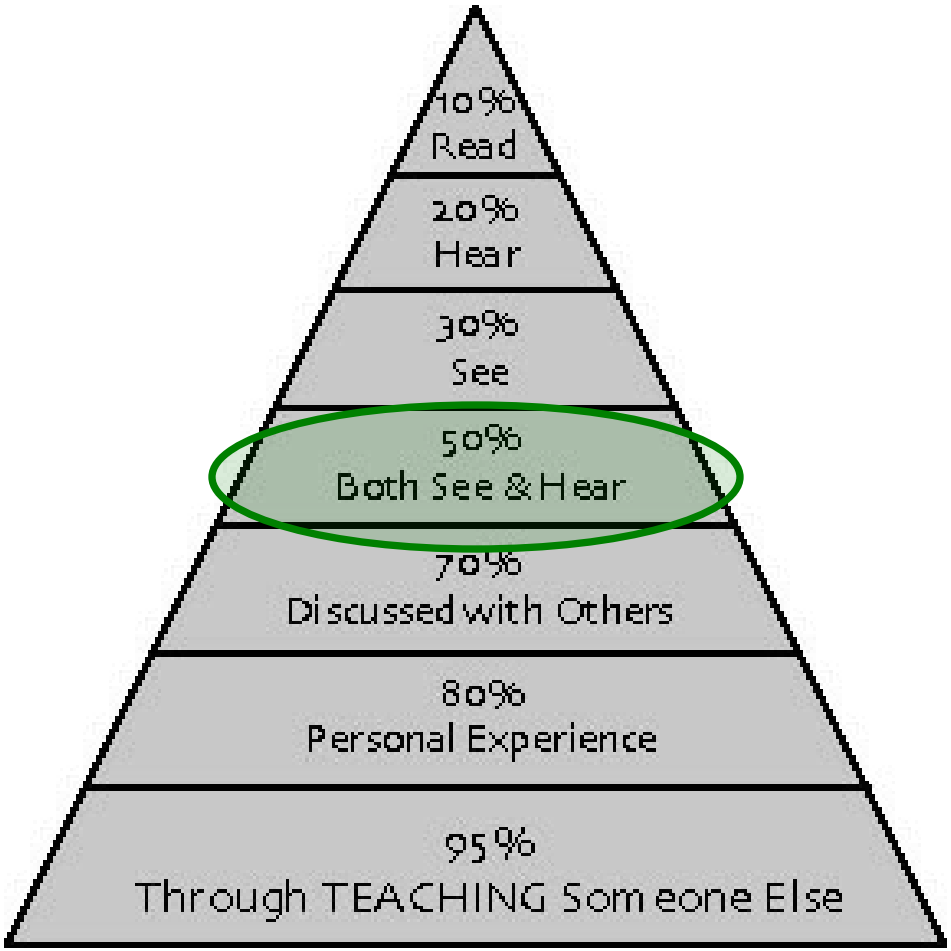
Target Audience	Where to Aim
Board of Trustees / Regents	Moderate detail; illustrative quotes; summaries that help them make connections; erring on side of policy-setting vs. micromanaging
Cabinet / Executive	Moderate detail; low amount of narrative; tables / bullet lists that help consolidate data into broad topical categories; conclusions, implications, recommendations clearly stated
Faculty and Other Experts	Fairly high amount of detail in tables; graphics that display results; define terminology; clear inferences and conclusions; references and citations
Lay People	Simple graphics; illustrative quotes
All	Organize around themes; clear labeling of sections so reader can skim/skip; technical and statistical details in an appendix

Resource: Bers & Seybert

Audience Appropriate Reporting

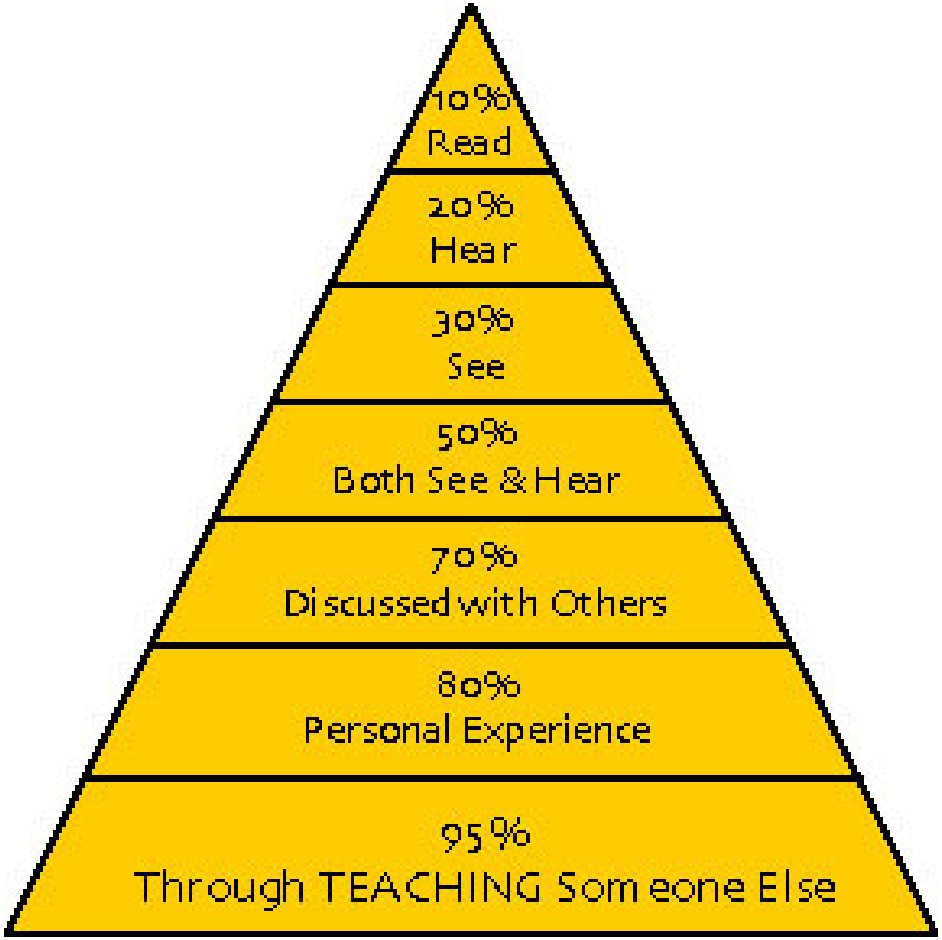


Dale's Cone of Experience



Dale, E (1969)

Dale's Cone of Experience



http://www.marketingplannow.com/index.asp?page=2090

Deliverables

Purposes of Reports

- **Historical record**
- **Support for planning**
- **Support for policy/program development**
- **Support for policy/program improvement**
- **Public relations**
- **Compliance**

Resource: Bers & Seybert

Small group activity

What are the advantages/ disadvantages of: Word, Excel, PPT, & PDF as the platform for deliverables?

Tools for Deliverables

Tool	Pros	Cons
Excel	Can interact with the data	Usually no narrative summary provided—conclusions are up to the user
PDF	All content is protected from change	Not interactive—if we want our work to be used we need to let people use it (interact, copy-paste, etc.)
PPT	Bells and whistles	Can be challenging to make it "stand-alone"
Word	Can get a lot of content on a page	Visually less interesting than PPT

Essential Content

- **Meaningful title**
  - Leader/header on each page
- **Author/office of origin**
- **Source of data**
- **Page numbers**

Organizing Content

- **Focus on the big ideas/news**
  - Aggregate first then drill down to subgroups
    - Show trends when possible
    - Identify significant differences
  - With survey items start with the “overall” item (e.g. overall satisfaction) and then discuss more specific items

Organizing Content – cont.

- **Unless there is a meaningful order to the categories in a table/chart, sort results from largest to smallest**
- **Percentages may be more meaningful than means**
  - Top/Bottom Two Box %

Tables and Charts

Tables vs. Charts

	Tables	Charts
Data	Exact values, end-user can manipulate the data (depending on which deliverable tool is used), works for qualitative data	Sometimes requires user to estimate the values, data is not (usually) interactive, not appropriate for qualitative data
Trends	May take some study to see trends and patterns--this increases as the number of data elements increases	Easy to see trends and patterns
Interactions	May take some study to see interactions--this increases as the number of data elements increases	Easy to see interactions

Question:

What other things go into your decision to use either tables or charts?

Overall Tips

- **Don’t settle for the default settings**
- **Maximize the amount of “ink” used on the data and minimize the “ink” everywhere else (grid lines, boxes, etc.)**
- **If something stands out (different font, different colored bar in a chart, etc.) it should be for a reason**
- **Round results (except things like GPA)**

Tables

Tables – Basic Organization

- **Organize columns and rows in a meaningful way**
  - Natural order (past to future)
  - Meaningful grouping (ranks of faculty)
  - Alphabetical
  - Magnitude of values (largest to smallest)

Tables – Basic Organization – cont.

- **Only one piece of data per cell**
- **Maintain consistent alignment of data**
  - Column labels centered
  - Numbers to right
  - Decimals and percentage signs aligned
  - Text to left

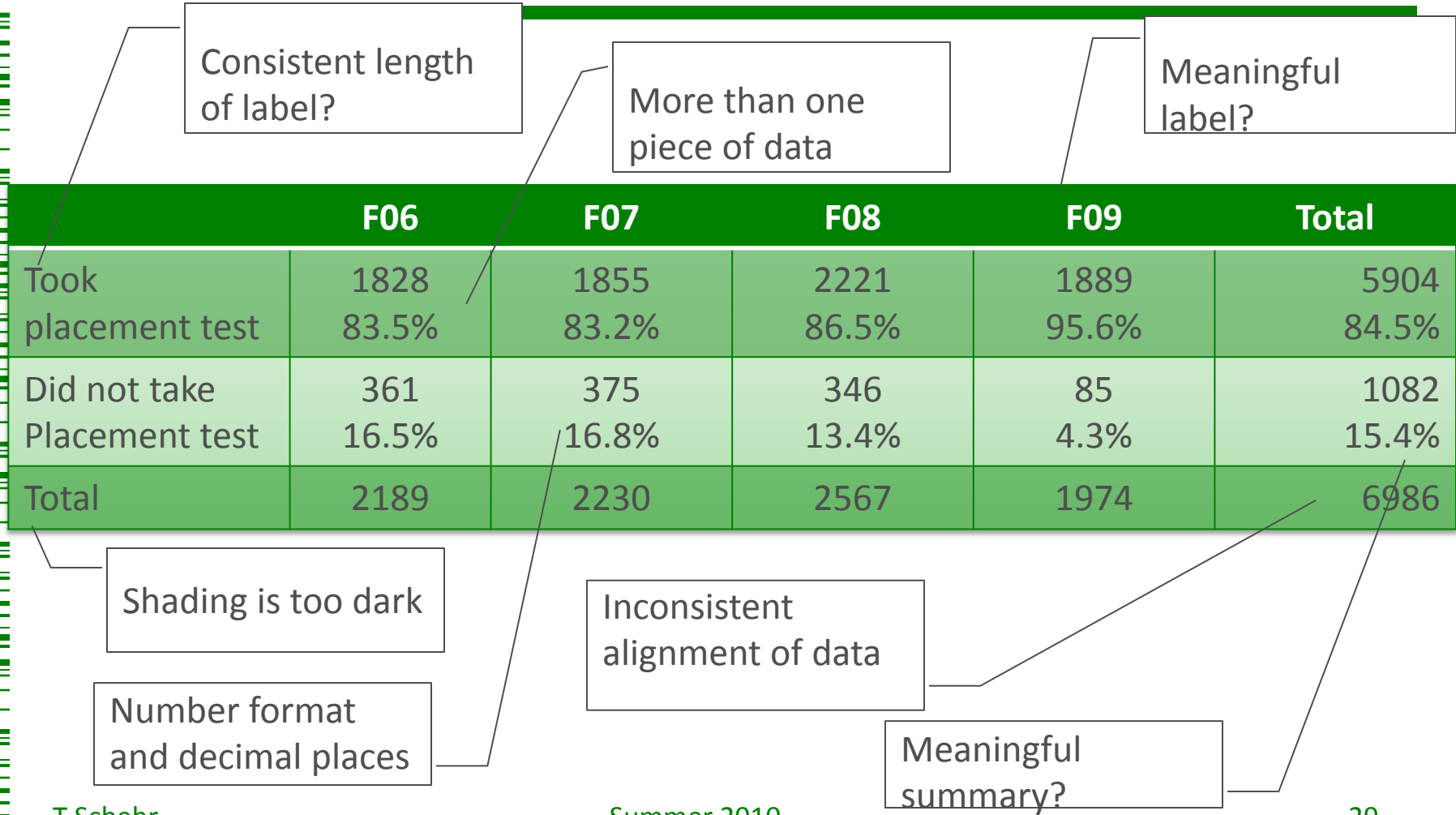
Tables – Text

- **Avoid orientating text differently than from left –to-right (horizontal)**
- **Avoid using ALL CAPS**
- **Use meaningful variable names and labels**
- **Try for consistent length of variable labels**

Tables – Numbers

- **Use appropriate number formats**
  - Commas in whole numbers
  - % next to every percentage value
- **Include column and row summaries as appropriate**
  - Totals
  - Means/Medians

Tables – Example 1



	F06	F07	F08	F09	Total
Took placement test	1828 83.5%	1855 83.2%	2221 86.5%	1889 95.6%	5904 84.5%
Did not take Placement test	361 16.5%	375 16.8%	346 13.4%	85 4.3%	1082 15.4%
Total	2189	2230	2567	1974	6986

Tables – Better Example 1

Took Placement Test?	Fall 2006		Fall 2007		Fall 2008		Fall 2009		Summary	
	N	%	N	%	N	%	N	%	Total	Avg
Yes	1,828	84%	1,855	83%	2,221	87%	1,889	96%	5,904	88%
No	361	16%	375	17%	346	13%	85	4%	1,082	13%
Total	2,189	100%	2,230	100%	2,567	100%	1,974	100%	6,986	100%

Tables – Even Better Example 1

Took Placement Test?	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Avg
Yes	84%	83%	87%	96%	88%
No	16%	17%	13%	4%	13%

Tables – Example 2

organization is not meaningful

all CAPS and centered

difficult to track across the rows

Data are not aligned in columns

Fictitious Data on Where Urban Studies Graduate Students Enroll					
Row Labels	**2006**	**2007**	**2008**	**2009**	**Grand Total**
ANTIOCH UNIVERSITY - NEW ENGLAND		7			7
BALTIMORE CITY COMMUNITY COLLEGE				1	1
BAYLOR UNIVERSITY			5	2	
(blank)		2	1	2	
BOSTON UNIVERSITY	3				
CREIGHTON UNIVERSITY			3		
IMMACULATA UNIVERSITY	9				9
LAKE TAHOE COMMUNITY COLLEGE		2			2
LOUISIANA TECH UNIVERSITY		5			
NORTHEASTERN UNIVERSITY	2		2		
SALT LAKE COMMUNITY COLLEGE		2			
ST JOHNS UNIVERSITY	11			2	
TOWSON UNIVERSITY		5	3	1	
TULANE UNIVERSITY		2			2
UNIVERSITY OF KANSAS		8			8
UNIVERSITY OF PHOENIX		1			1
VILLANOVA UNIVERSITY			4		4
Grand Total	**25**	**34**	**18**	**8**	**85**

Tables – Better Example 2

	Number of Students Admitted in fall of . . .				
Where do Urban Studies graduate students enroll?	**2006**	**2007**	**2008**	**2009**	**Total**
St. Johns	11			2	**13**
Towson		5	3	1	**9**
Immaculata	9				**9**
University of Kansas		8			**8**
Baylor			5	2	**7**
Antioch University – New England		7			**7**
Louisiana Tech		5			**5**
Villanova			4		**4**
Northeastern	2		2		**4**
Creighton			3		**3**
Boston University	3				**3**
Tulane		2			**2**
Salt Lake Community College		2			**2**
Baltimore City Community College				1	**1**
Grand Total	**25**	**29**	**17**	**6**	**77**

Tables – Example 3

Table 3. Amount of Time in a Typical Week During the Prior Year Spent in Prayer or Meditation

	Loyola Class of 2008 as Entering First-Year Students	Loyola Class of 2008 as Juniors	Class of 2008 Juniors at Catholic Institutions
None	21%	23%[c]	30%
Less than 1 hour	39%	41%	34%
One to Two Hours	31%	25%	26%
Three hours or more	9%	11%	10%

C – indicates a significant difference between Loyola juniors and juniors at other Catholic institutions.

Tables – The Last Word

- **When a table is a cross-tab put the independent variable on the columns and use column percentages**
- **If a table breaks across pages, repeat column and row labels as appropriate**
- **Pick a format that works for you (and your audiences) and stick with it**

Charts

Charts – Basic Guidelines

- **Organize the data in a meaningful way**
- **Use prominent and clear graphical elements to show data**
- **Don’t clutter the interior of a chart**
- **Avoid using 3-dimensional charts**

Charts – Basic Guidelines – cont.

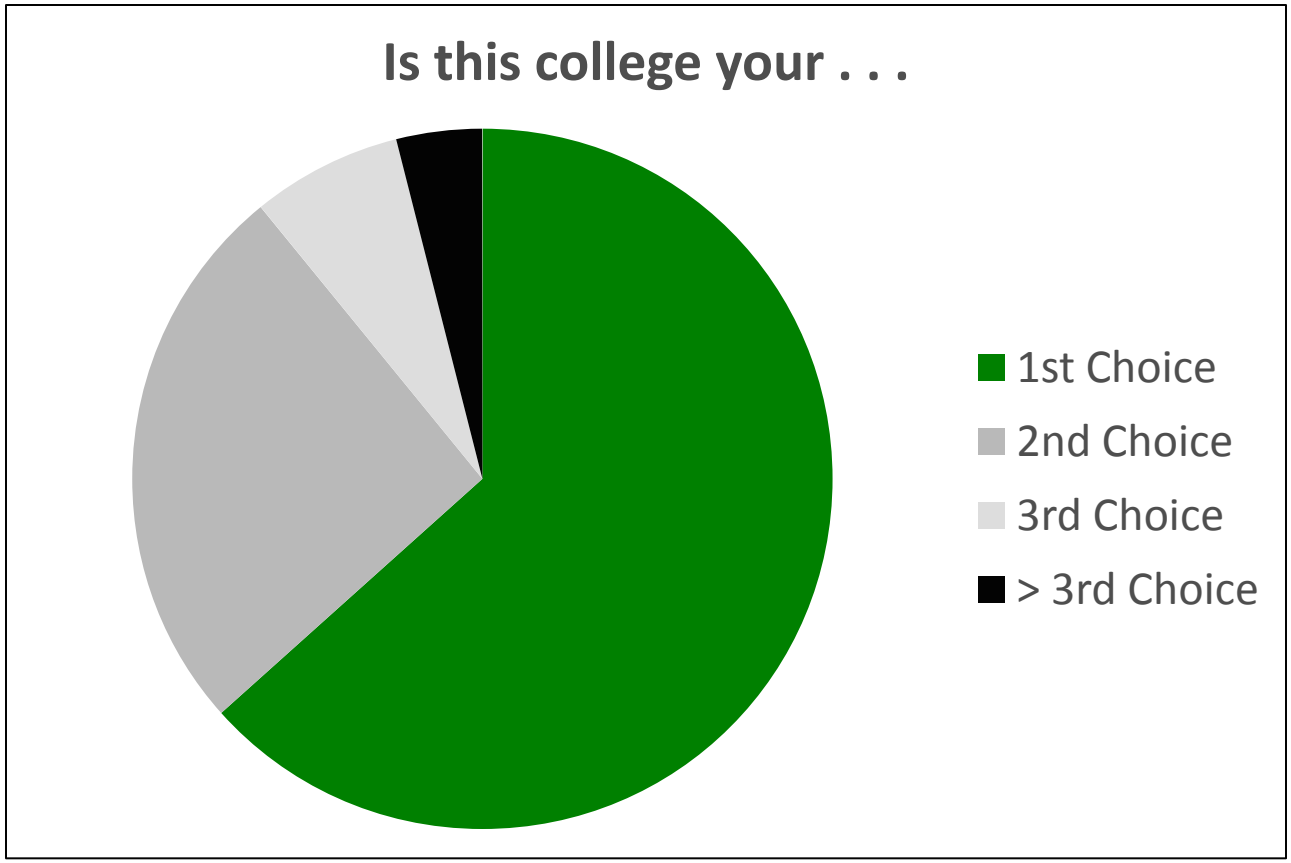
- **Include the detail about the data points on the chart whenever possible**
- **Keep series labels and legends short and easy to read**
  - When possible, label the chart data directly instead of using a legend

Types of Charts

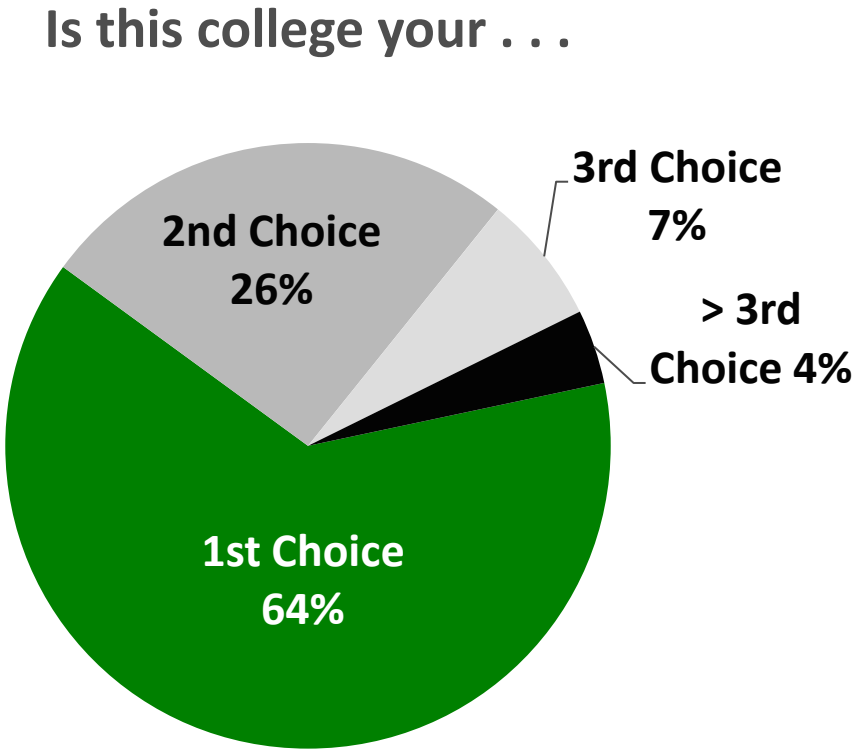
- **Depict size**
- **Depict change over time**
- **Depict what is typical or, alternatively, exceptional**
- **Depict relationships or predictions**

Charts Depicting Size

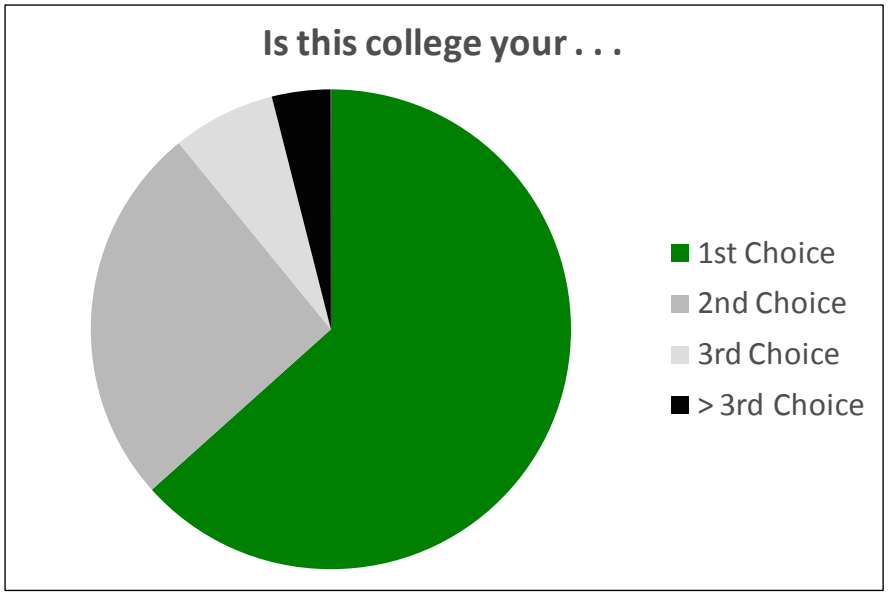
Pie Chart – Example 1

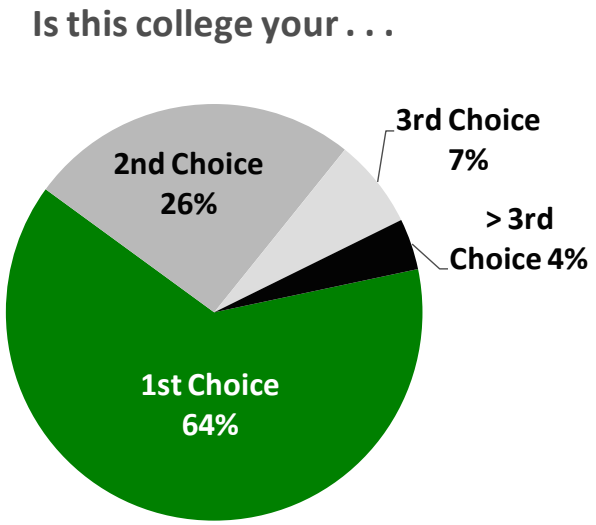


Pie Chart – Better Example 1

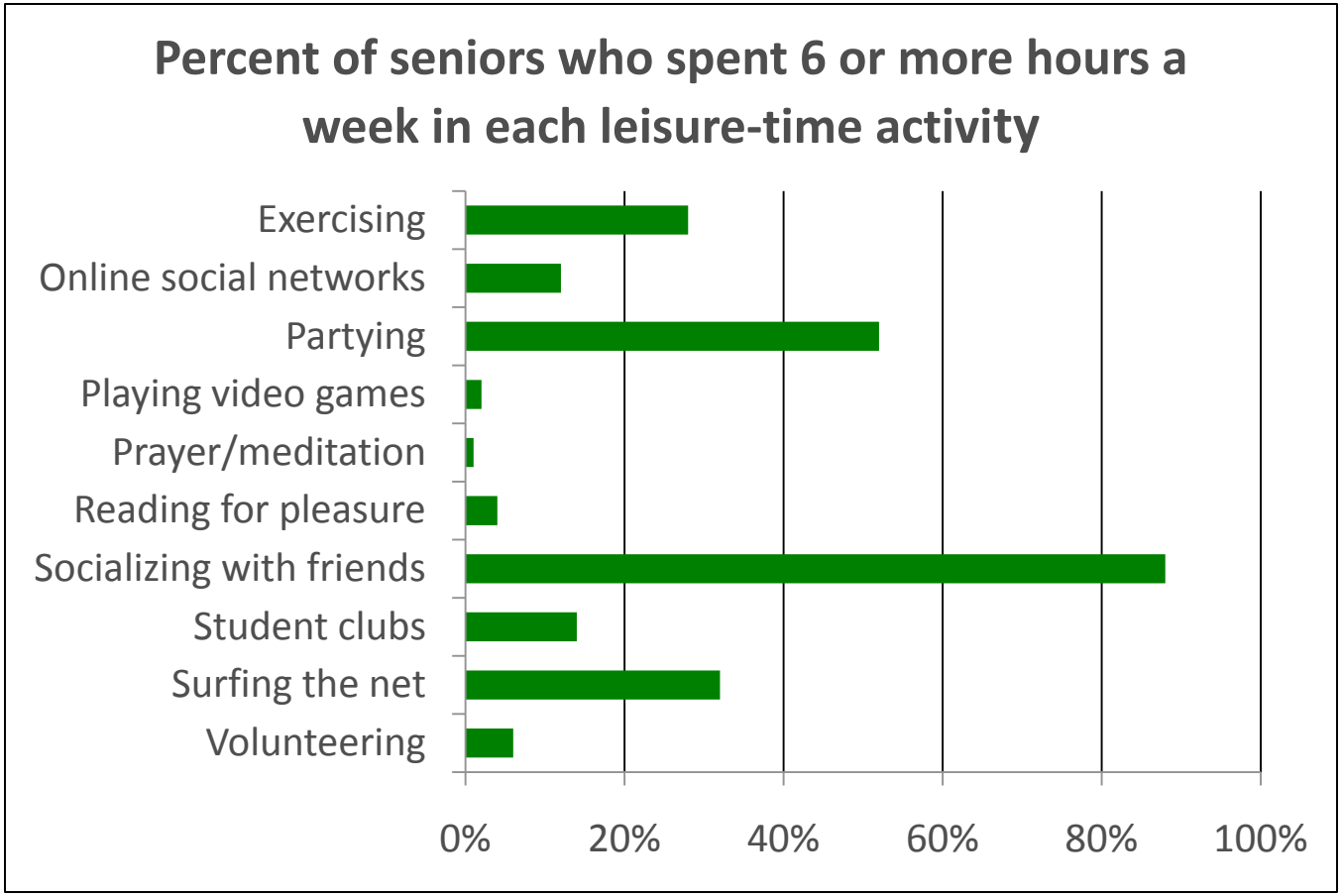


Pie Chart – Comparison

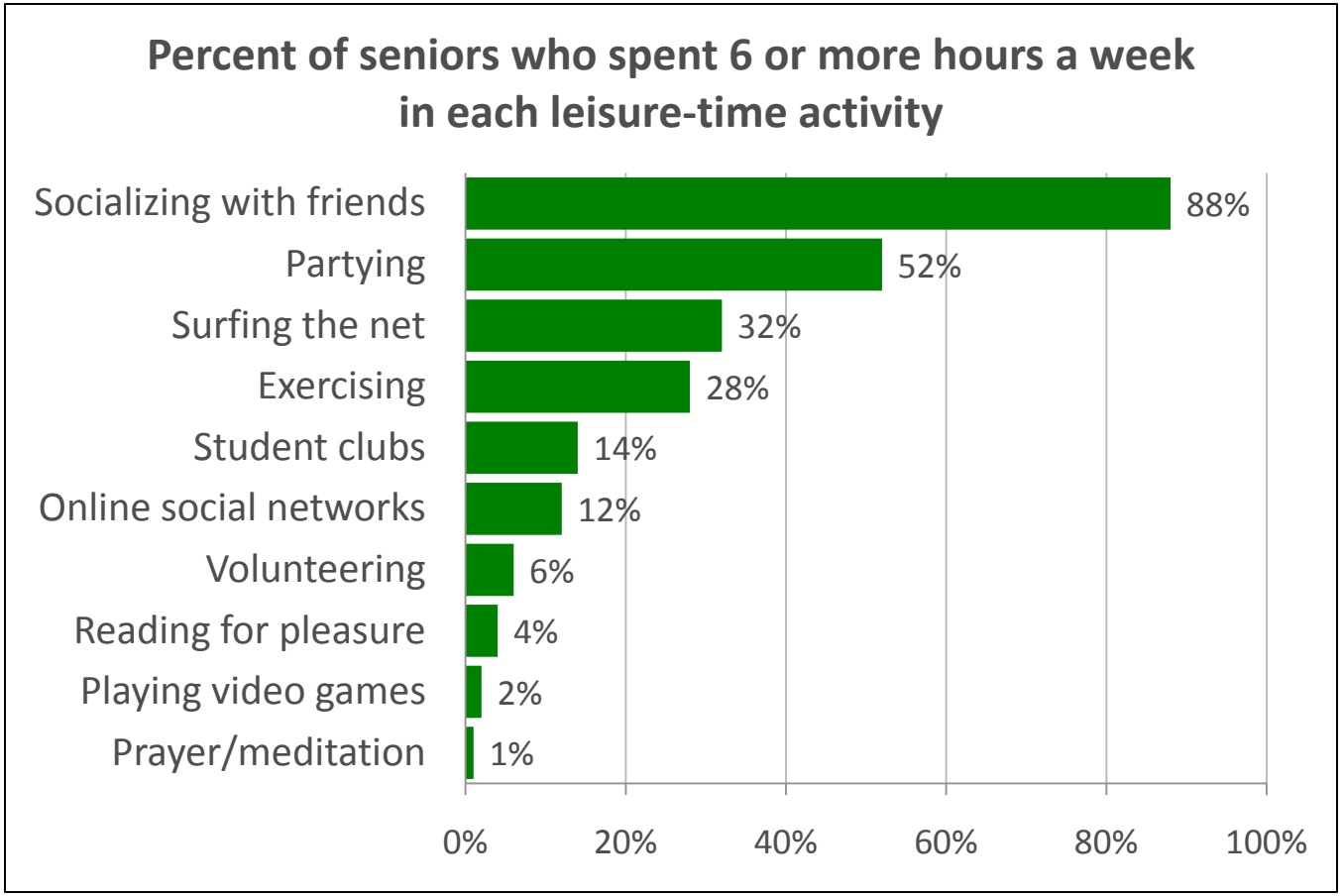




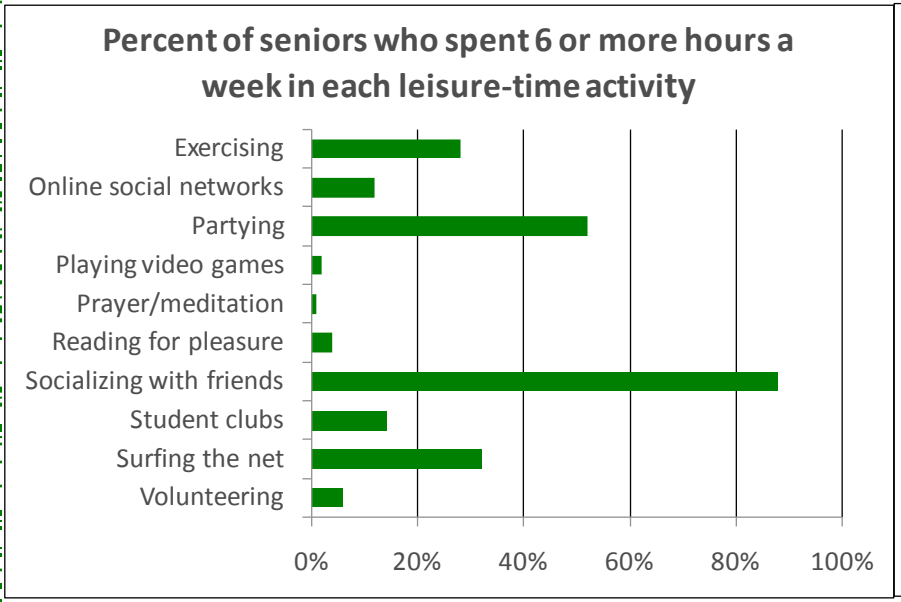
Bar Chart –Example 2

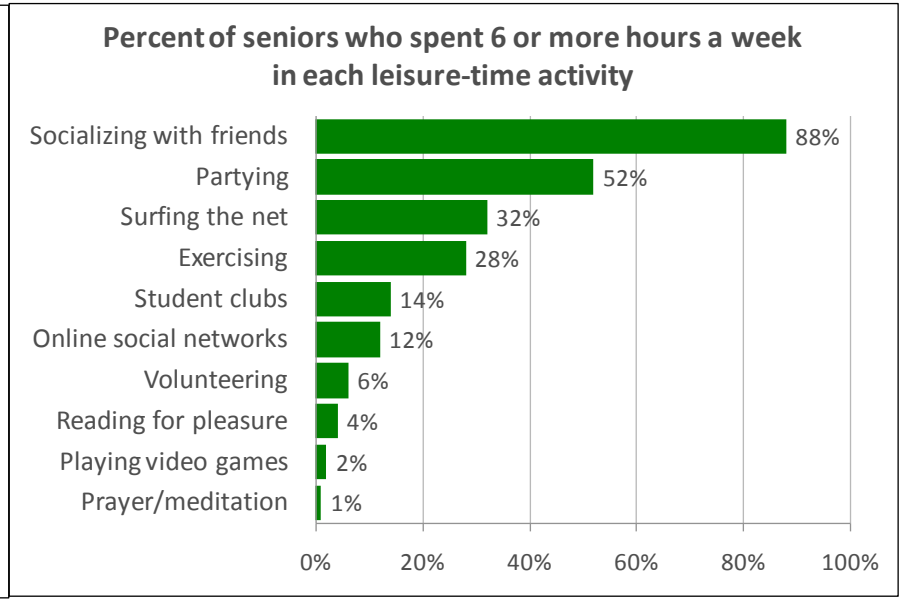


Bar Chart – Better Example 2



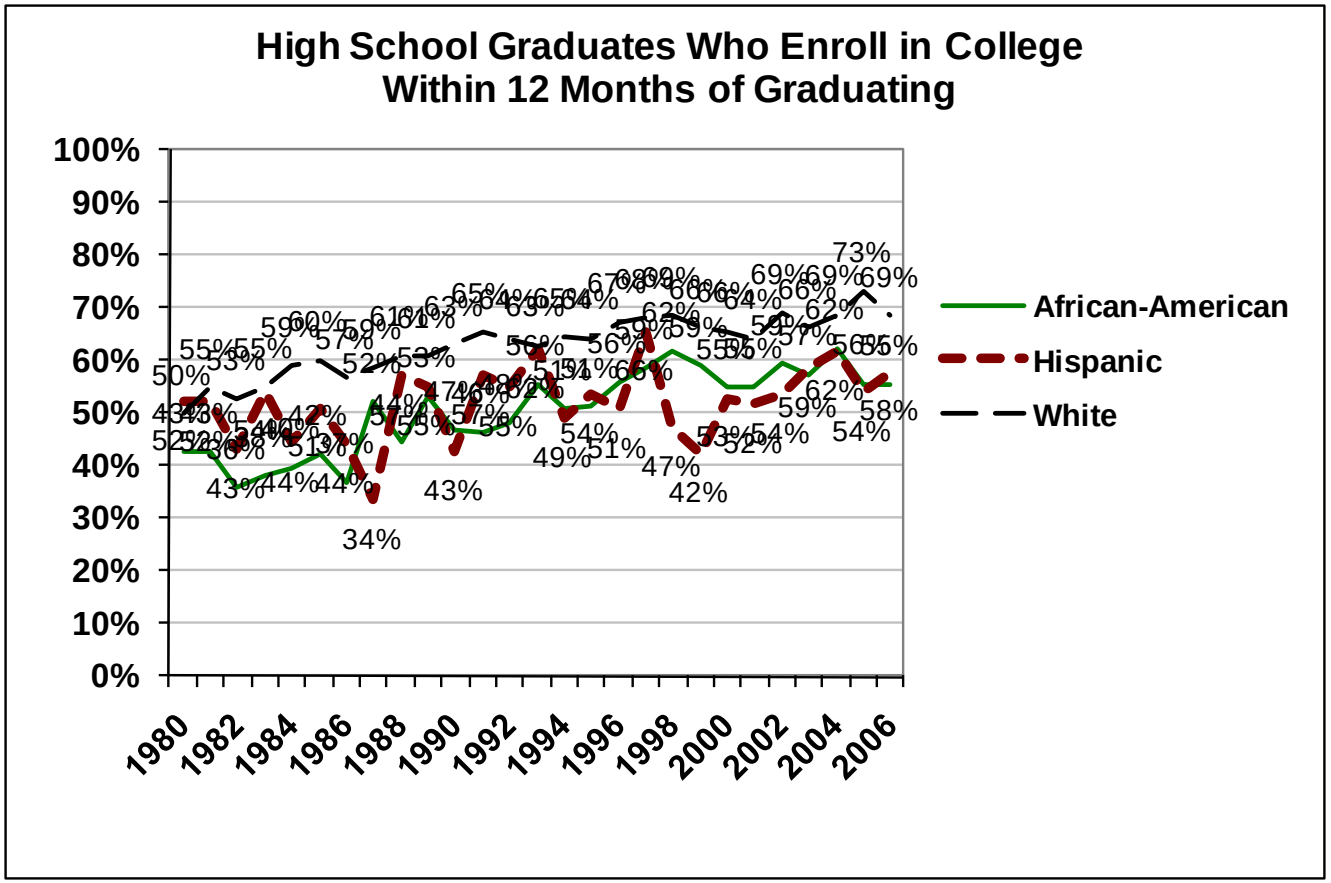
Bar Chart – Comparison



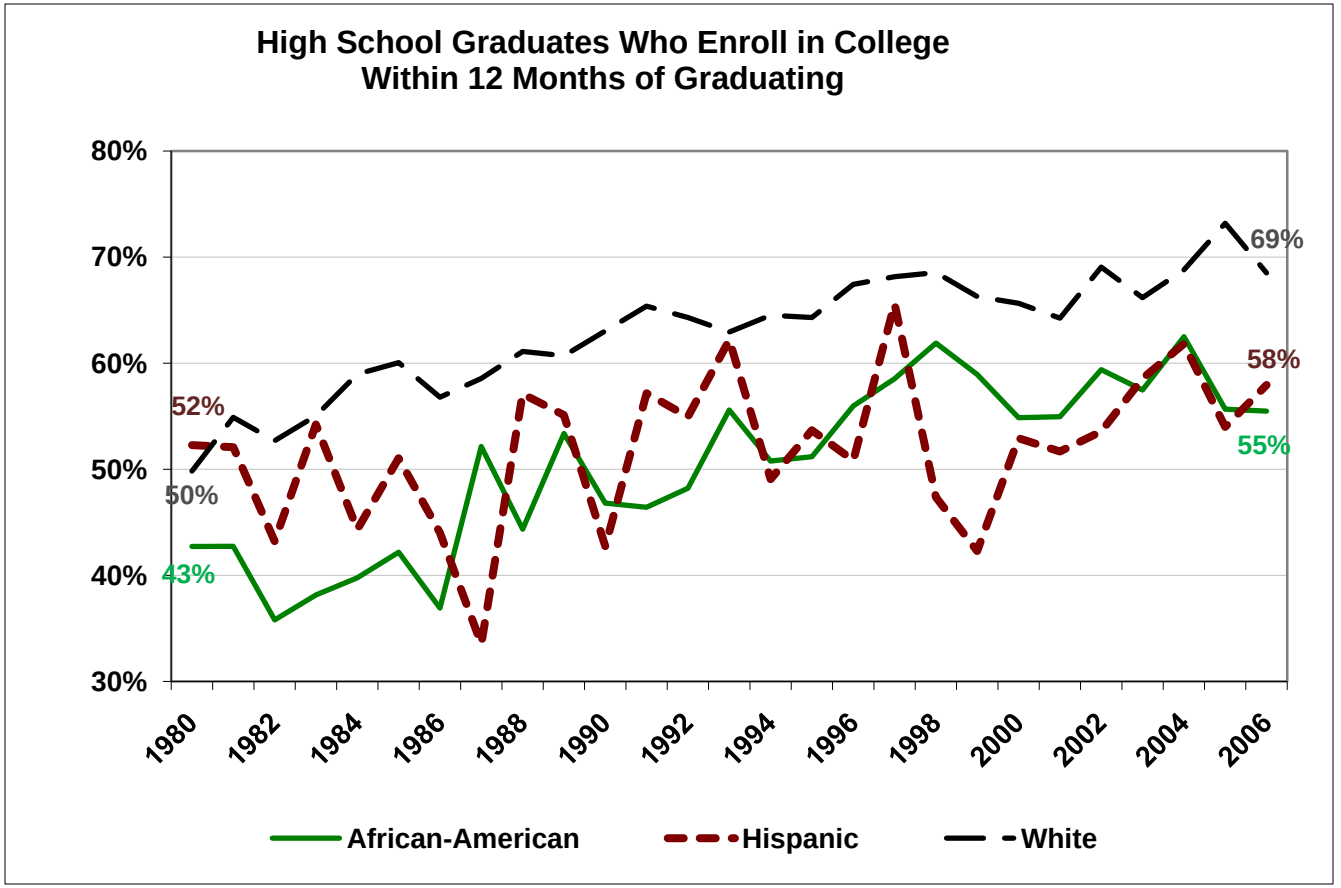


Charts Depicting Change Over Time

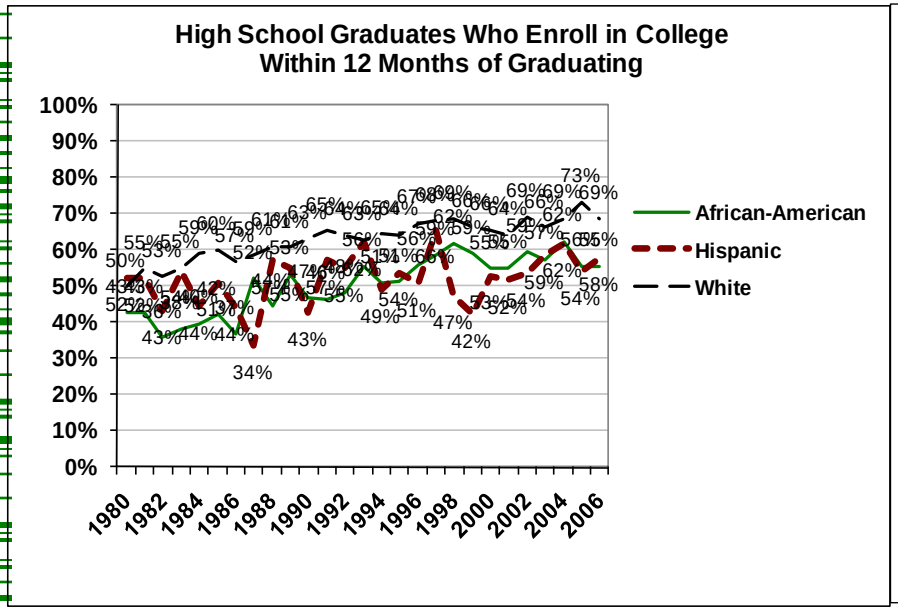
Line Chart – Example 3

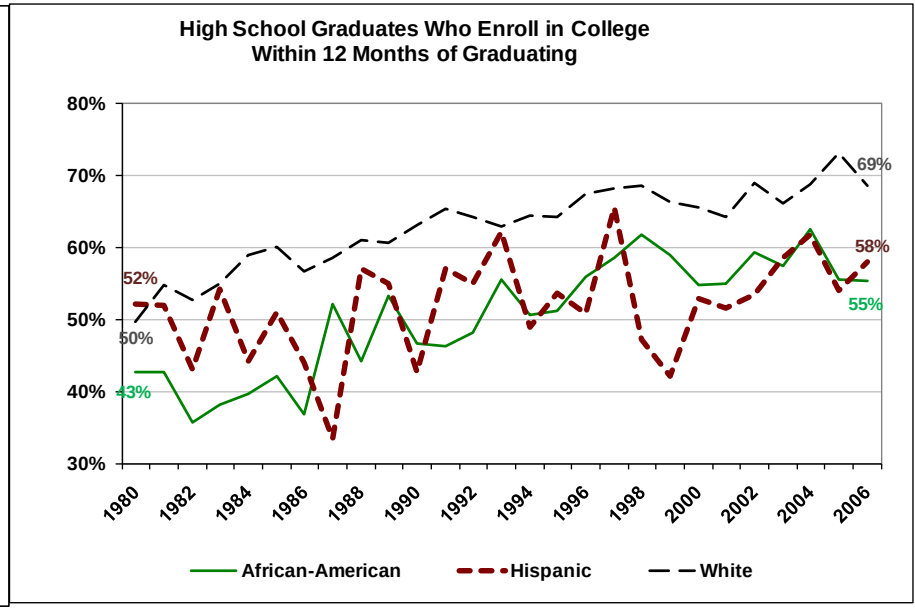


Line Chart – Better Example 3

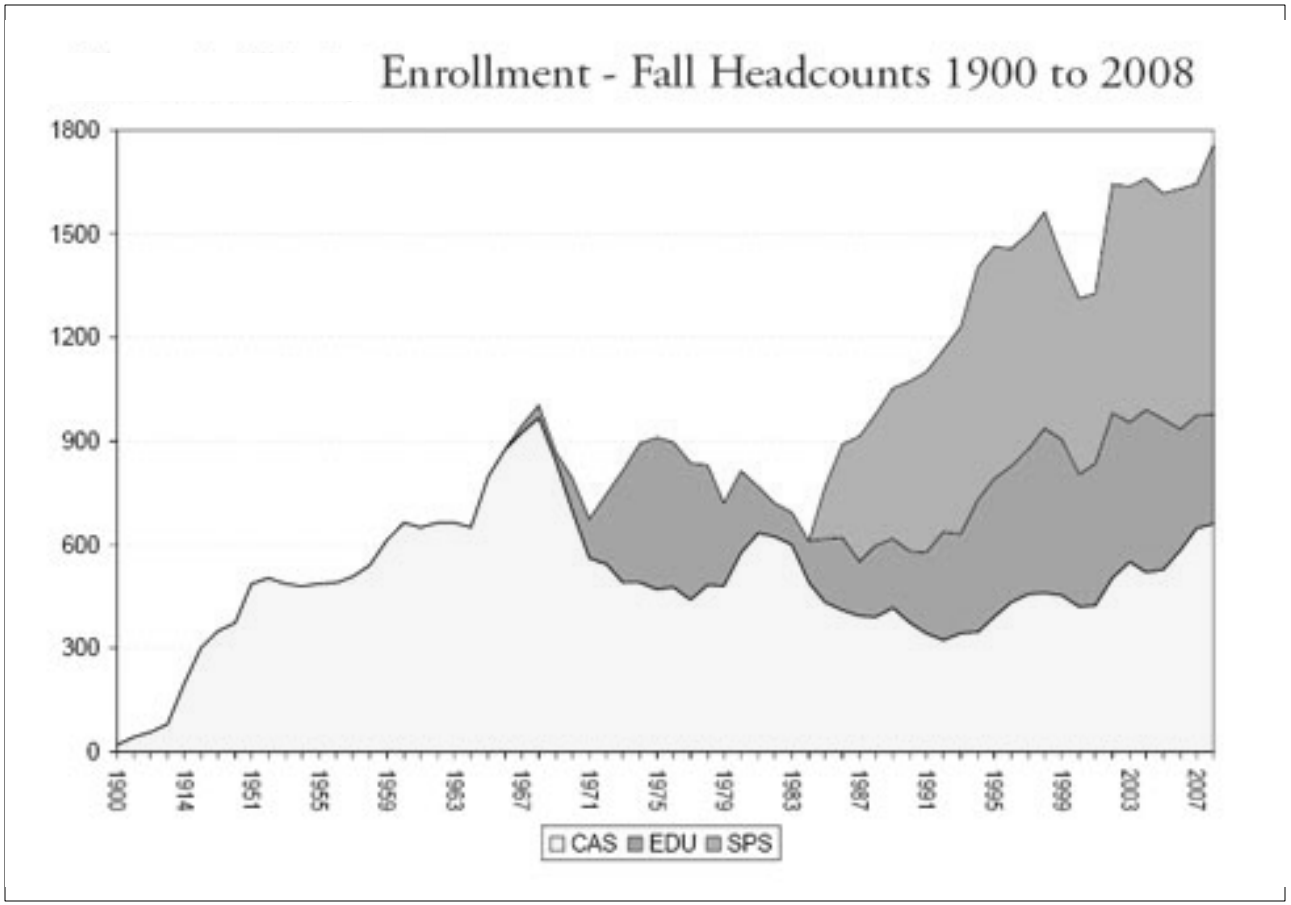


Line Chart – Comparison

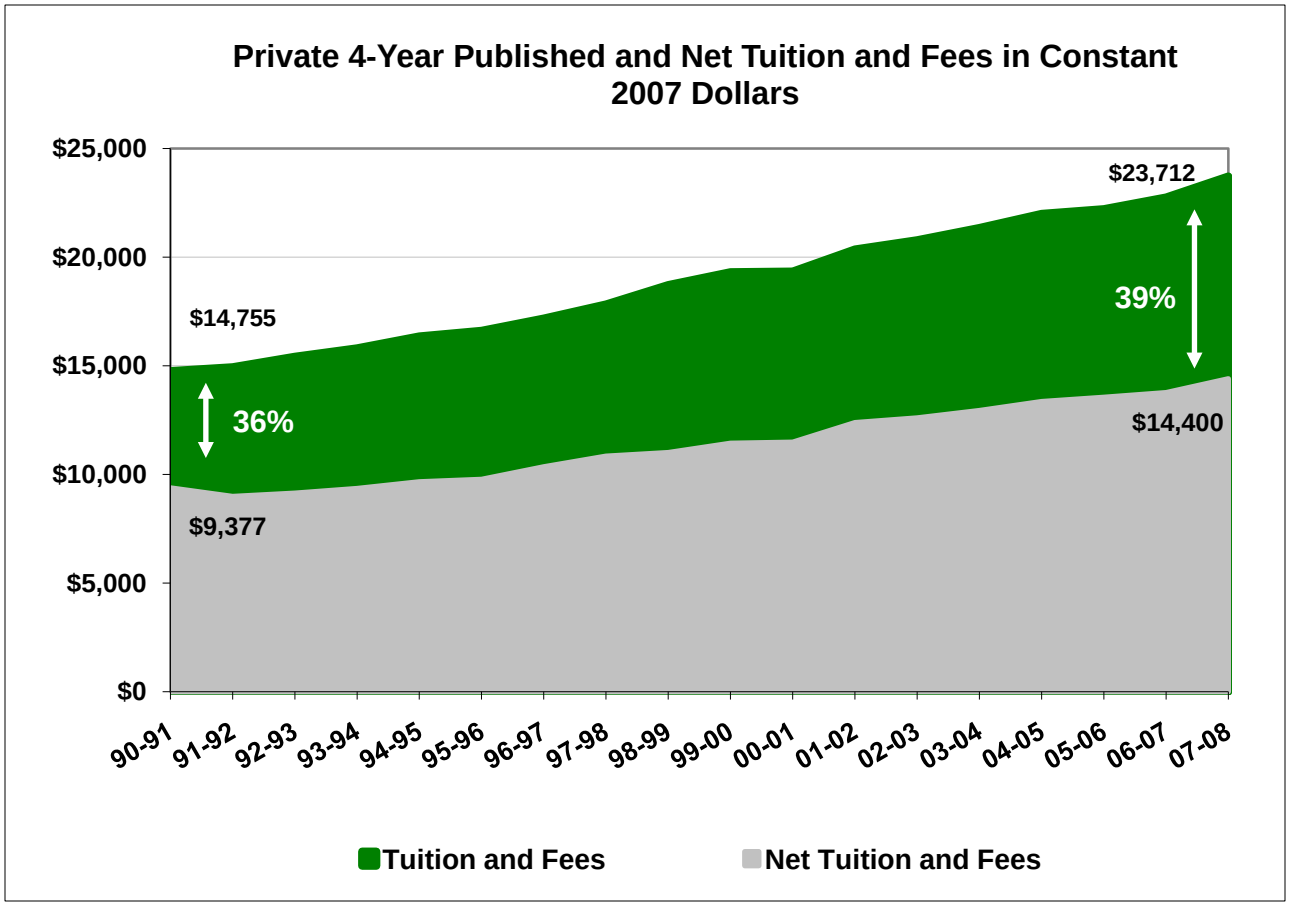




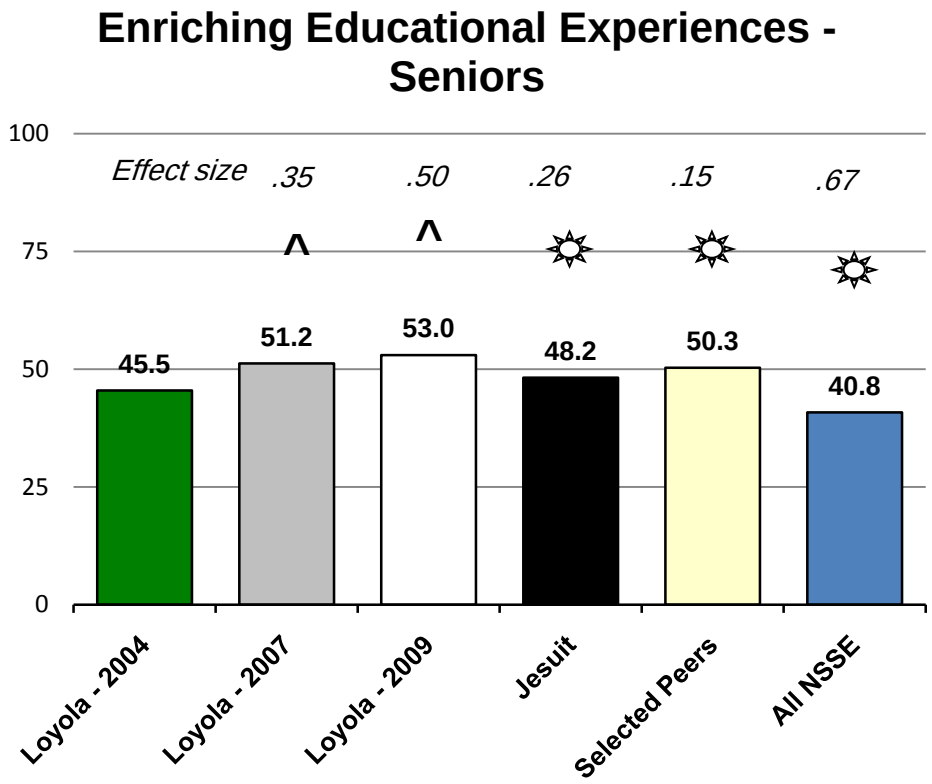
The Area Chart Debate – Example 4



The Area Chart Debate – Example 4



Column Charts – Example 5

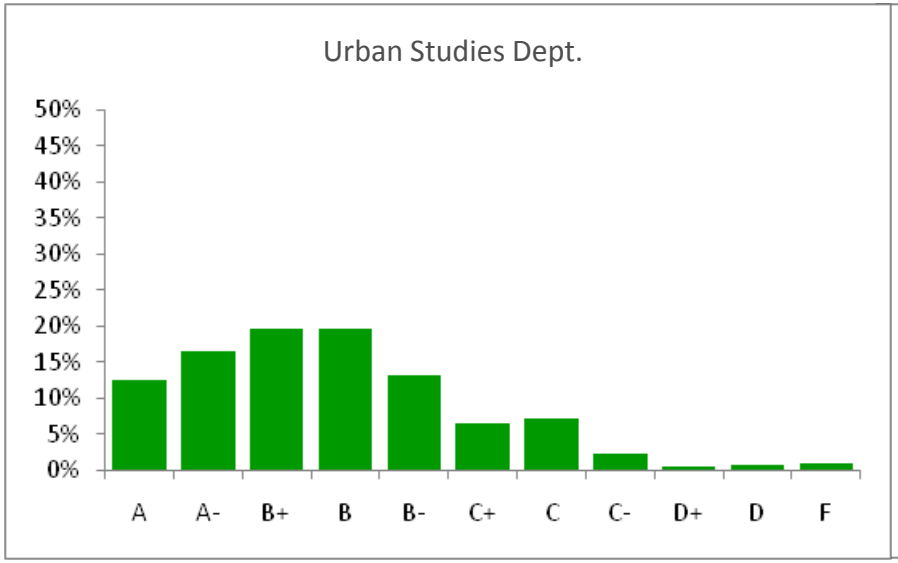


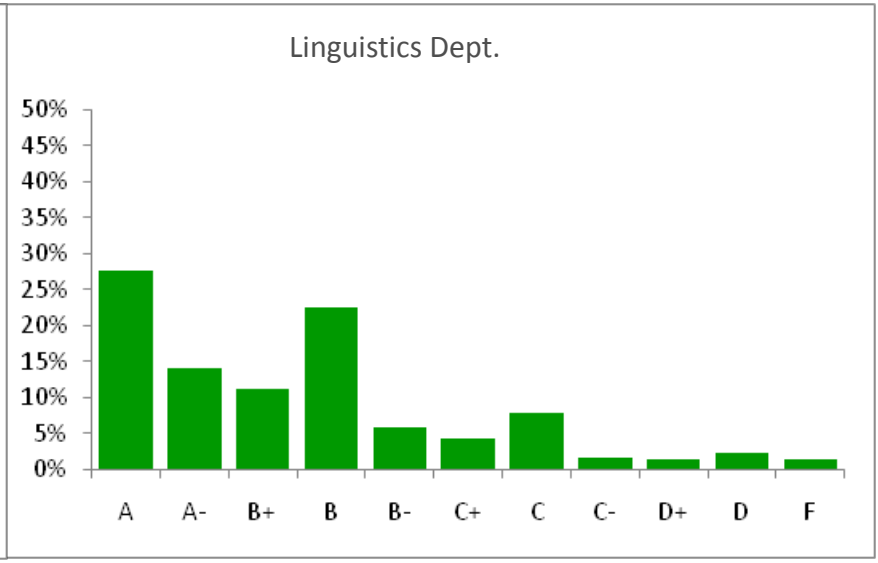
☼ Statistically significant difference from Loyola-2009 score

^ Statistically significant difference from Loyola-2004 score

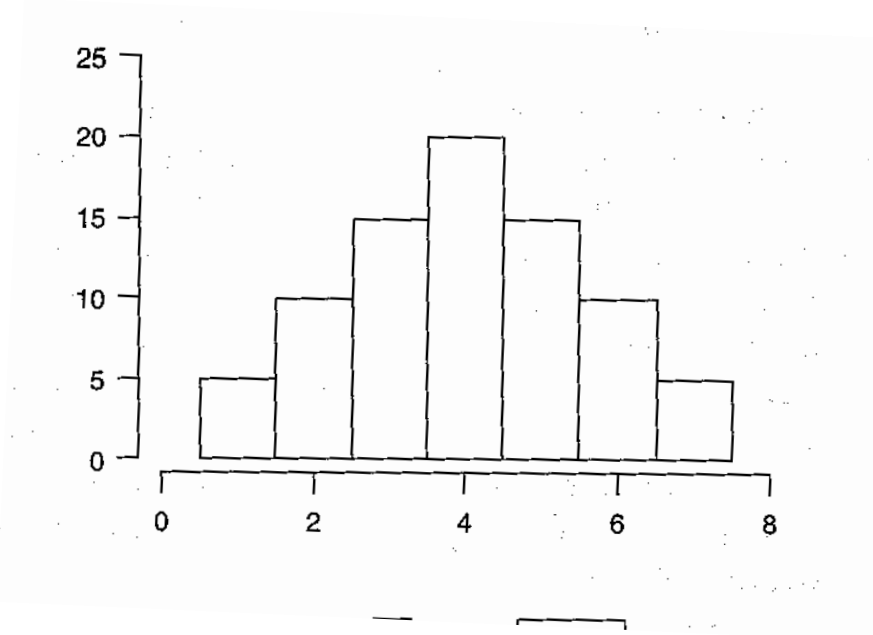
Charts Depicting What is Typical or Exceptional

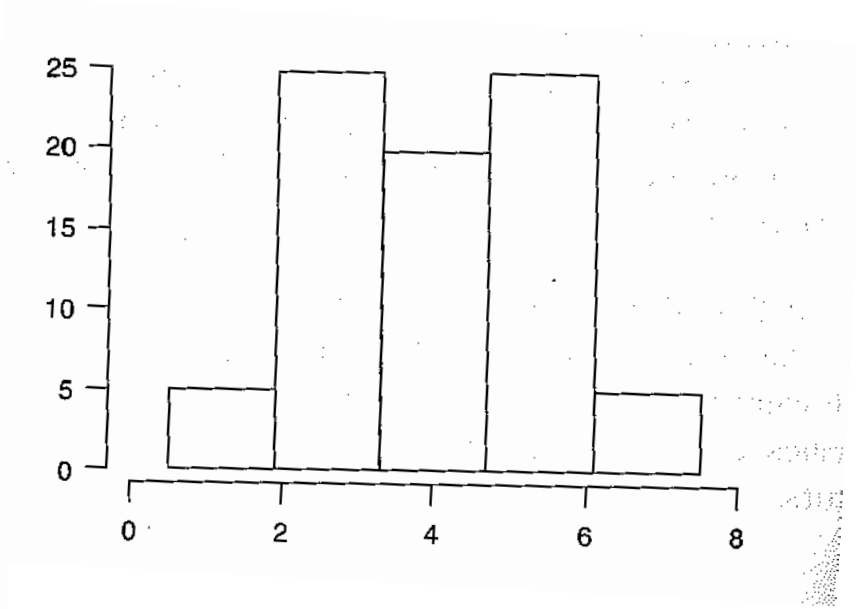
Histogram – Example 6



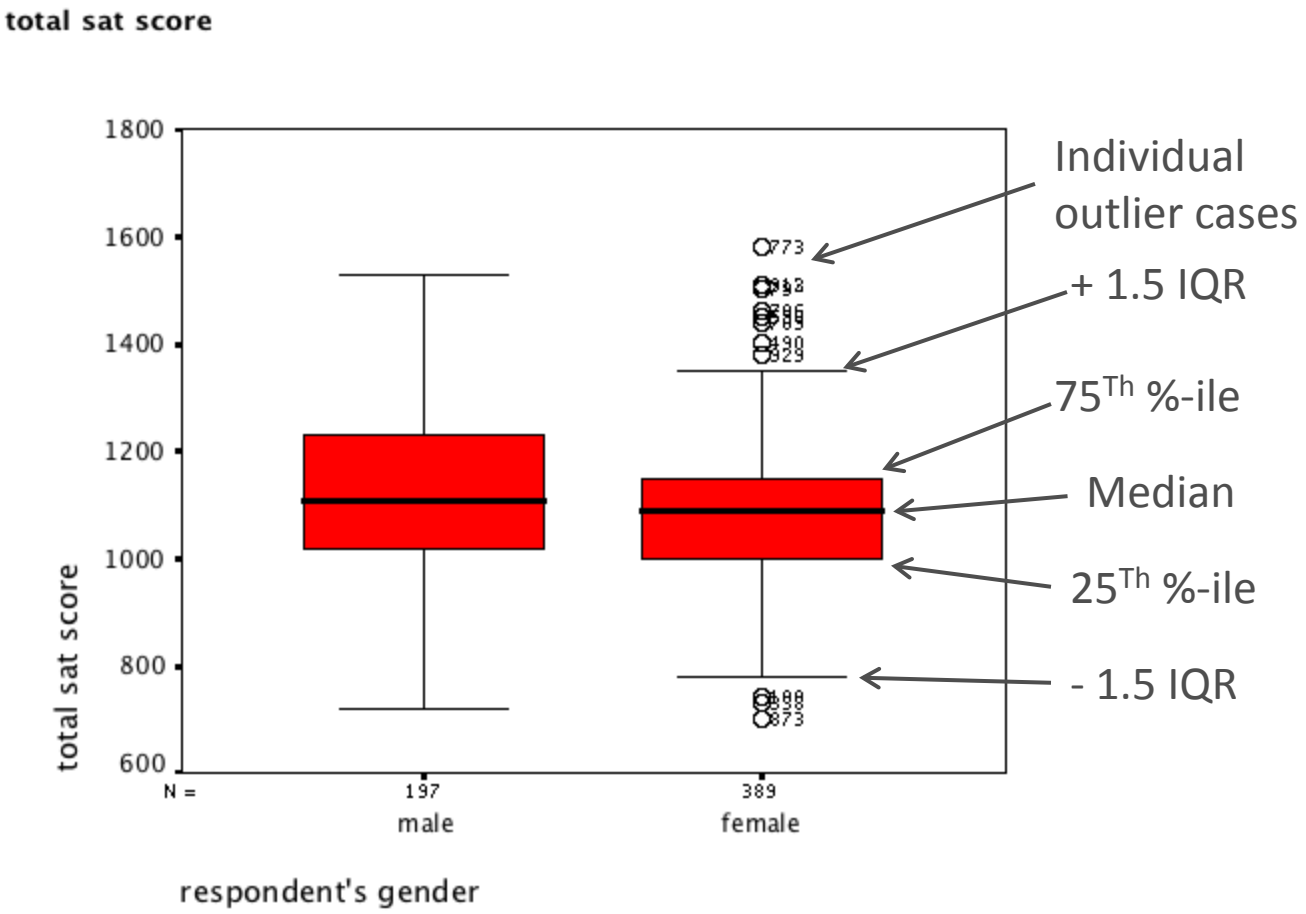


Histogram and Number of Bins

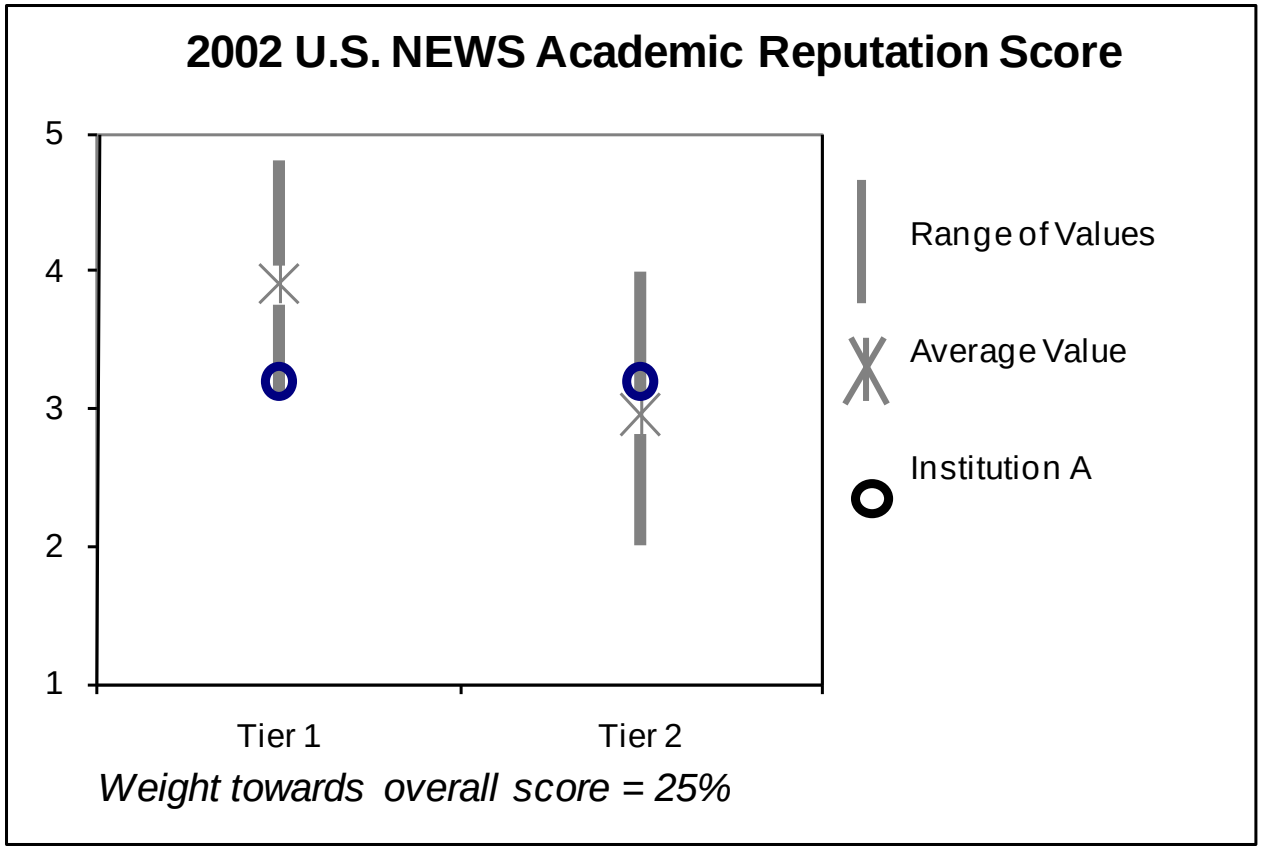




Box and Whisker Plots – Example 7

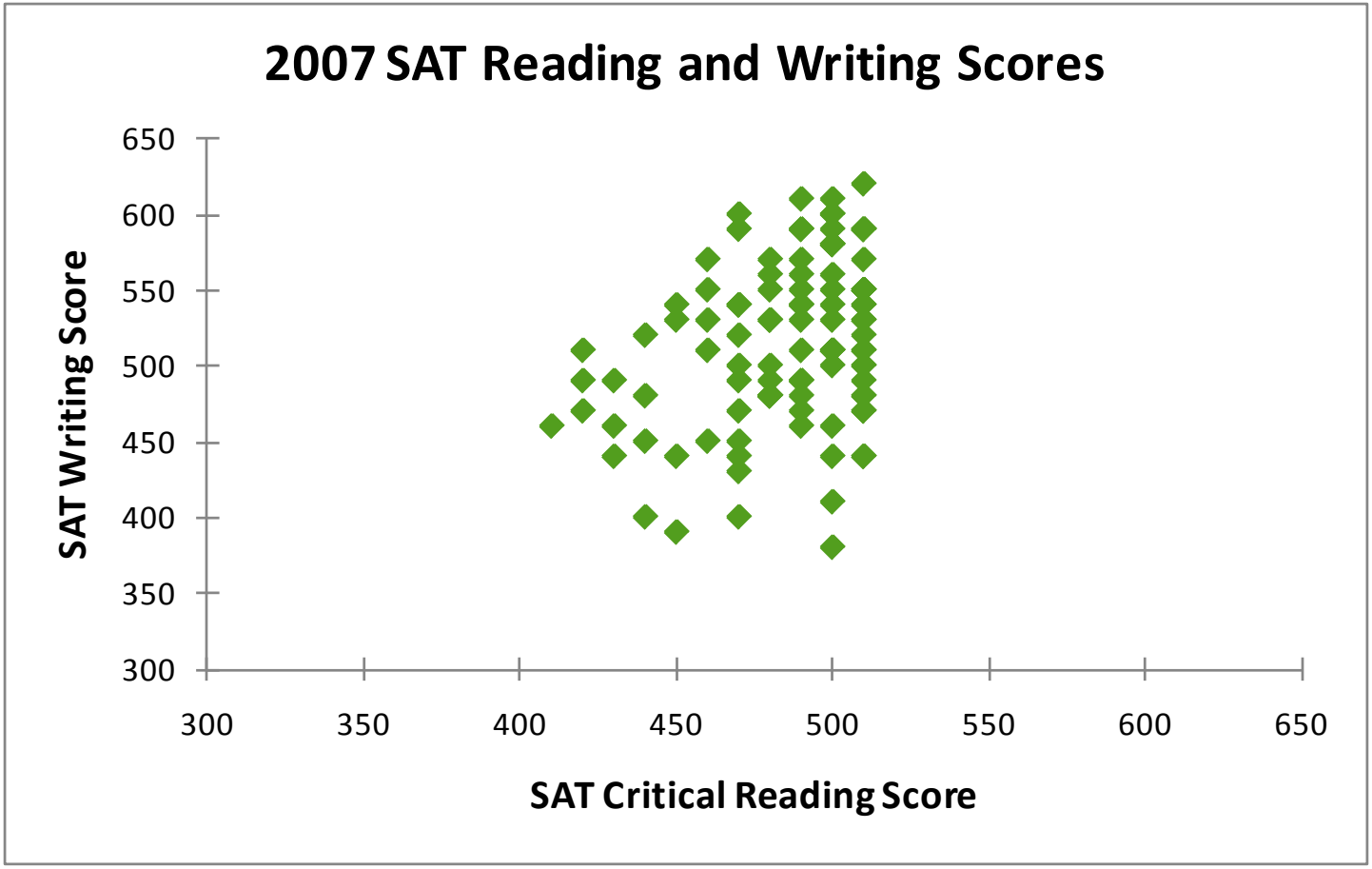


Trick Excel into Box-*like* Plots Using Stock Plots – Example 8

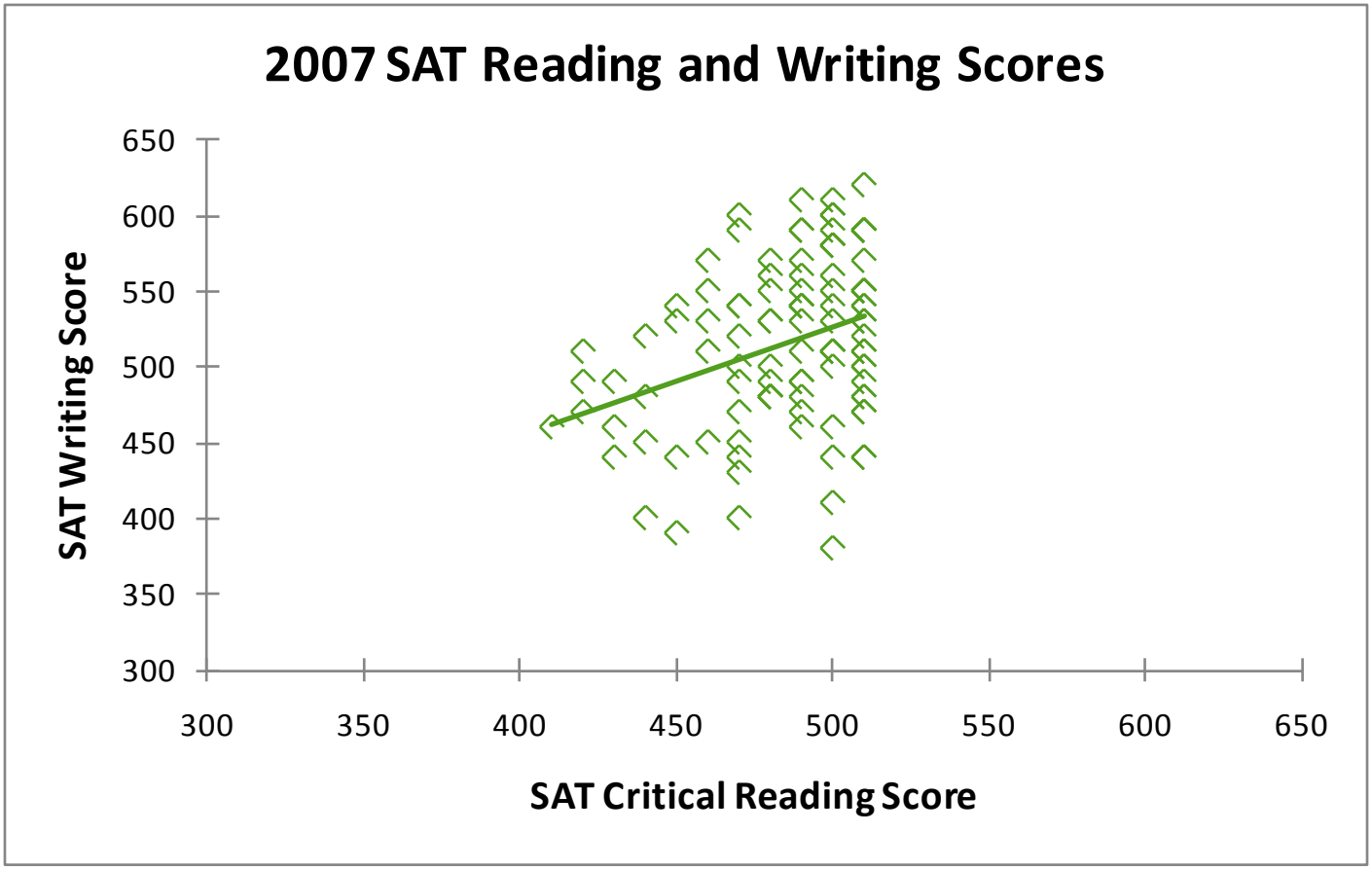


Charts Depicting Relationships or Predictions

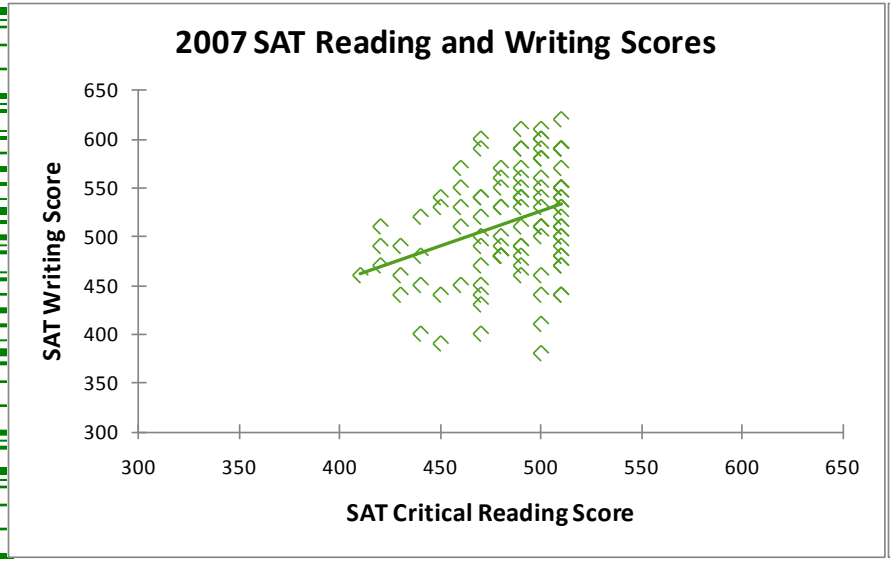
Scatterplot – Example 9

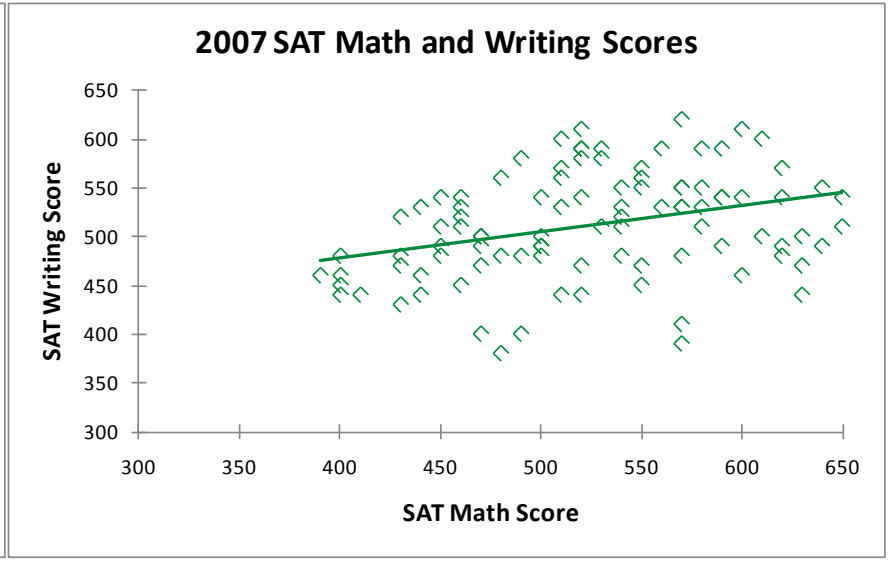


Scatterplot – Better Example 9

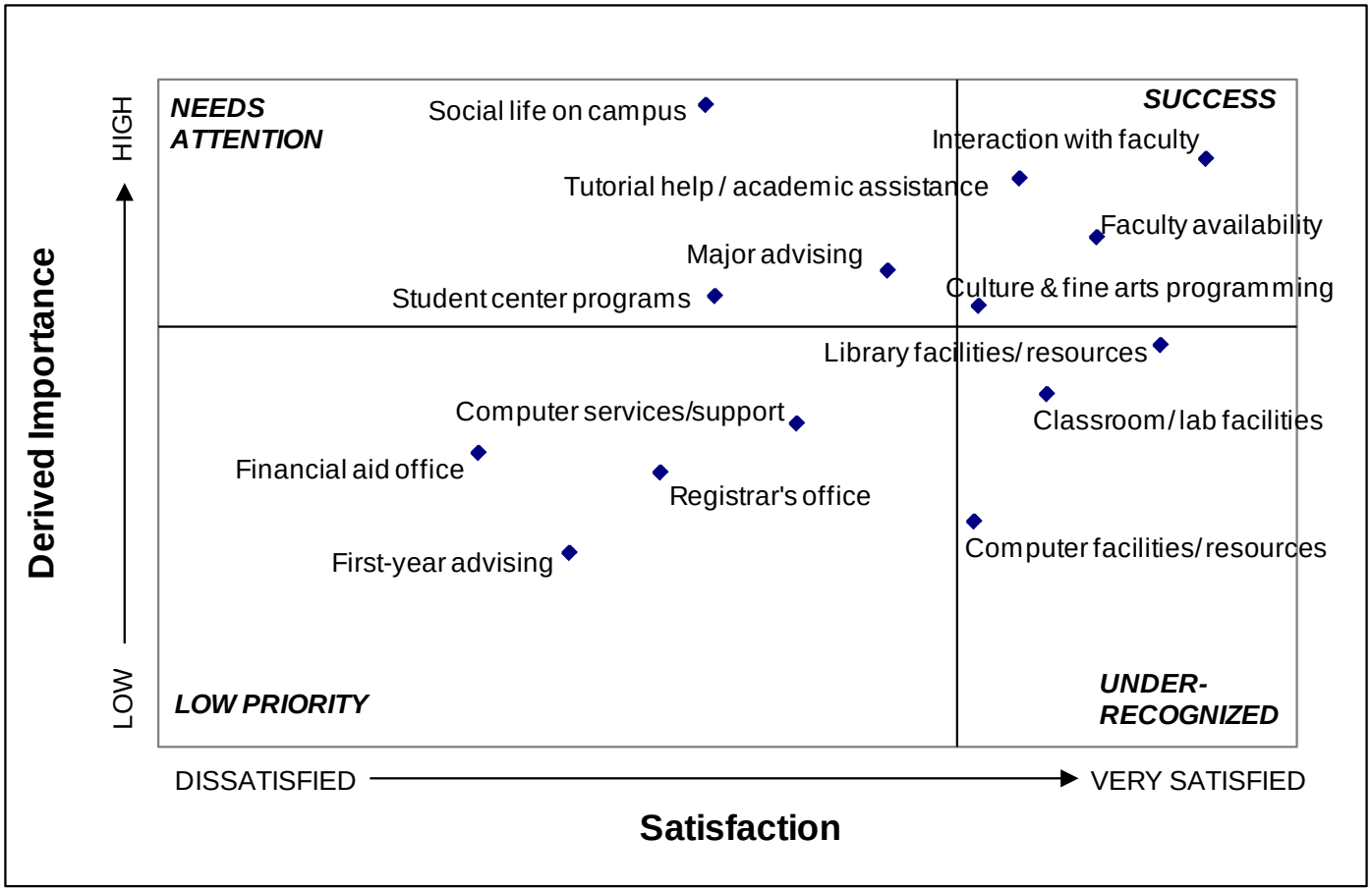


Scatterplot – Value of the Fit Line





Scatterplot of Summary Data – Example 10



Charts – The Last Word

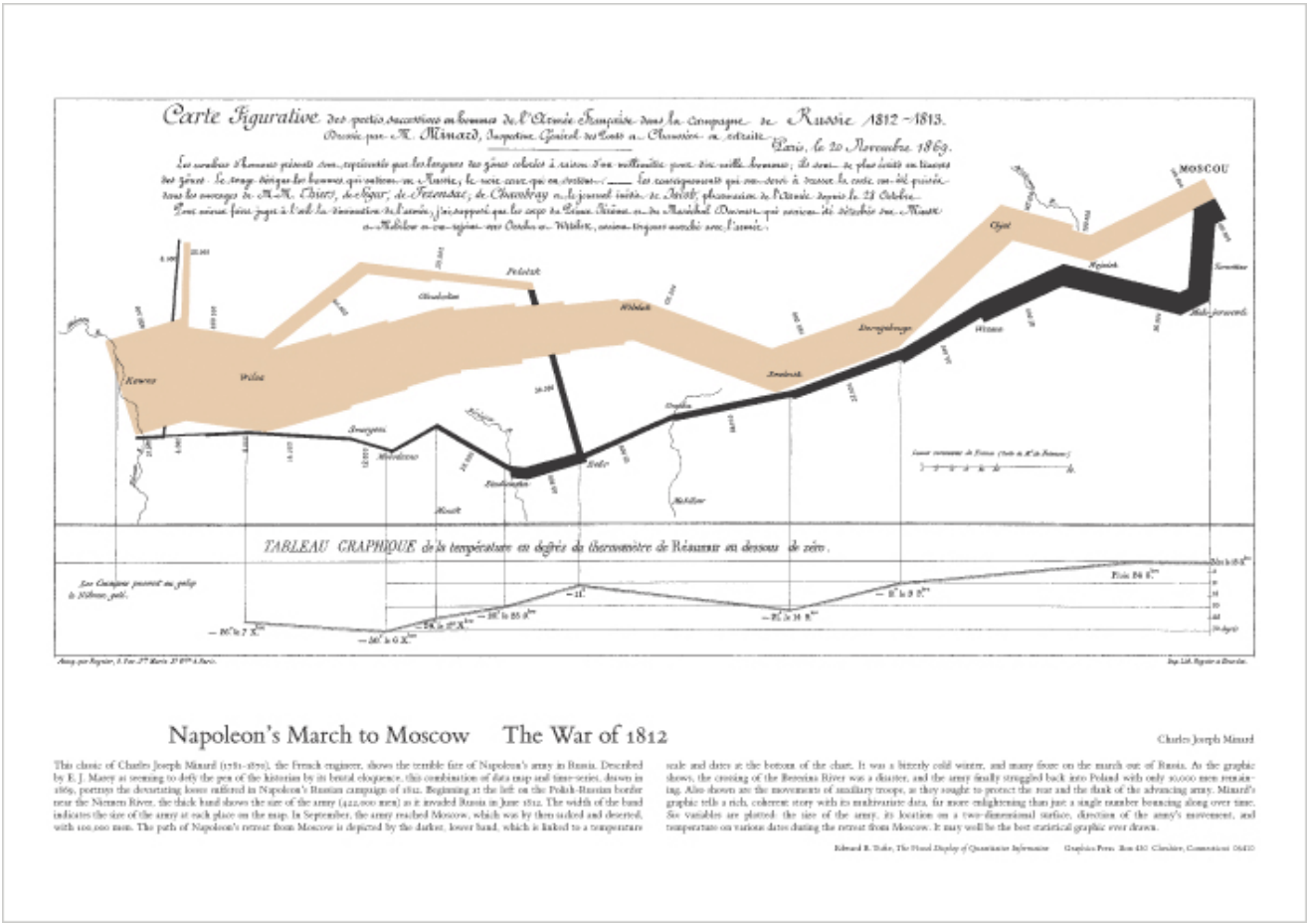
- **When using several charts in a document they should be consistent**
  - Use common chart types for similar types of data
  - Use common color schemes and sizes
  - Use a common baseline and scale

Supergraphics

What is a Supergraphic?

- Data rich
- Multi-graphic
- Usually a high resolution physical handout
- Ex: map, weather section in a news paper

The Best Supergraphic Ever?

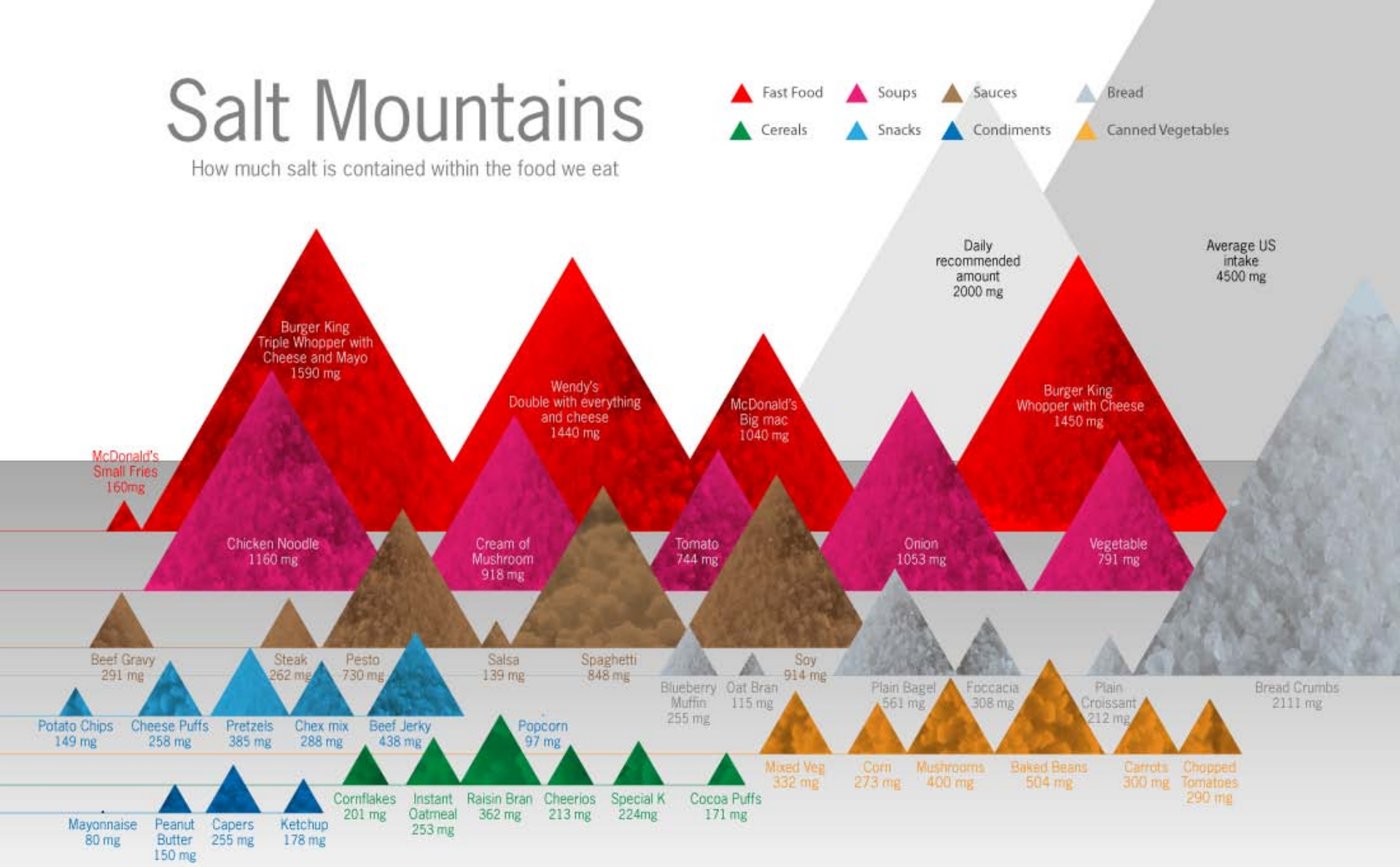


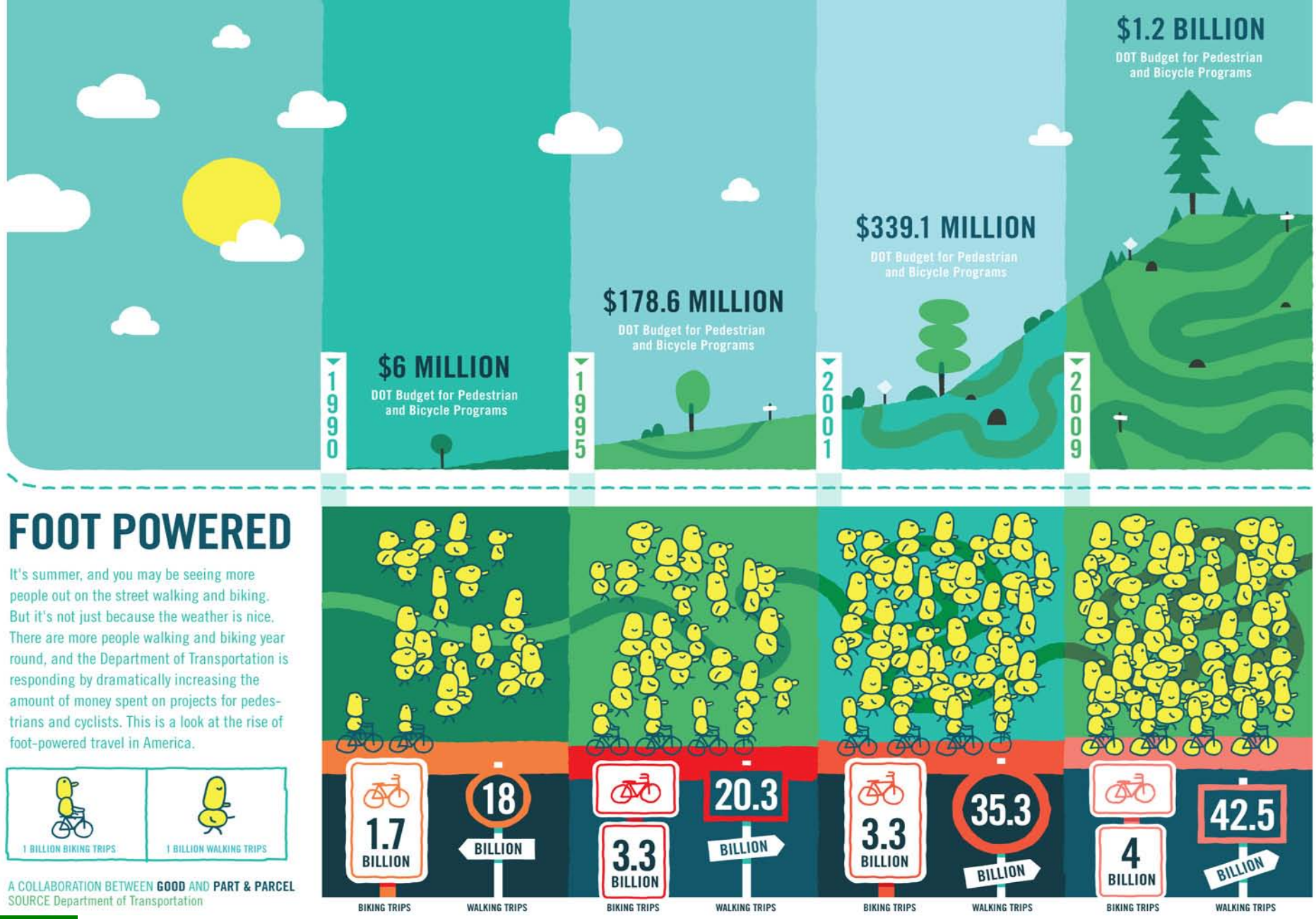
Napoleon's March to Moscow The War of 1812

Charles Joseph Minard

This classic of Charles Joseph Minard (1781–1870), the French engineer, shows the terrible fate of Napoleon's army in Russia. Described by E. J. Marey as seeming to defy the pen of the historian by its brutal eloquence, this combination of data map and time-series, drawn in 1869, portrays the devastating losses suffered in Napoleon's Russian campaign of 1812. Beginning at the left on the Polish-Russian border near the Niemen River, the thick band shows the size of the army (422,000 men) as it invaded Russia in June 1812. The width of the band indicates the size of the army at each place on the map. In September, the army reached Moscow, which was by then sacked and deserted, with 100,000 men. The path of Napoleon's retreat from Moscow is depicted by the darker, lower band, which is linked to a temperature scale and dates at the bottom of the chart. It was a bitterly cold winter, and many froze on the march out of Russia. As the graphic shows, the crossing of the Berezina River was a disaster, and the army finally straggled back into Poland with only 10,000 men remaining. Also shown are the movements of auxiliary troops, as they sought to protect the rear and the flank of the advancing army. Minard's graphic tells a rich, coherent story with its multivariate data, far more enlightening than just a single number bouncing along over time. Six variables are plotted: the size of the army, its location on a two-dimensional surface, direction of the army's movement, and temperature on various dates during the retreat from Moscow. It may well be the best statistical graphic ever drawn.

Edward R. Tufte, *The Visual Display of Quantitative Information* Graphics Press Box 430 Cheshire, Connecticut 06410


Salt Mountains
How much salt is contained within the food we eat
Fast Food
Soups
Sauces
Bread
Cereals
Snacks
Condiments
Canned Vegetables
Daily recommended amount 2000 mg
Average US intake 4500 mg
Burger King Triple Whopper with Cheese and Mayo 1590 mg
Wendy's Double with everything and cheese 1440 mg
McDonald's Big mac 1040 mg
Burger King Whopper with Cheese 1450 mg
McDonald's Small Fries 160mg
Chicken Noodle 1160 mg
Cream of Mushroom 918 mg
Tomato 744 mg
Onion 1053 mg
Vegetable 791 mg
Beef Gravy 291 mg
Steak 262 mg
Pesto 730 mg
Salsa 139 mg
Spaghetti 848 mg
Blueberry Muffin 255 mg
Oat Bran 115 mg
Soy 914 mg
Plain Bagel 561 mg
Foccacia 308 mg
Plain Croissant 212 mg
Bread Crumbs 2111 mg
Potato Chips 149 mg
Cheese Puffs 258 mg
Pretzels 385 mg
Chex mix 288 mg
Beef Jerky 438 mg
Popcorn 97 mg
Mixed Veg 332 mg
Corn 273 mg
Mushrooms 400 mg
Baked Beans 504 mg
Carrots 300 mg
Chopped Tomatoes 290 mg
Mayonnaise 80 mg
Peanut Butter 150 mg
Capers 255 mg
Ketchup 178 mg
Cornflakes 201 mg
Instant Oatmeal 253 mg
Raisin Bran 362 mg
Cheerios 213 mg
Special K 224mg
Cocoa Puffs 171 mg
NGF
Next Generation Food
www.nextgenerationfood.com
The salt content figures are the average salt content by food type per serving, not brand, for packaged and processed foods.
Items displayed are based on a selection of popular food types, loosely linked to personal taste of creator.
Sources: www.alsosalt.com food-facts.suite101.com www.annecollins.com
Created by Robin Richards | twitter: @ripetungi



http://awesome.good.is/transparency/web/1006/rise-of-walking-and-biking/flat.html

— the year TWO THOUSAND and NINE —

JOBLESS IN THE CITY

= 5000 Unemployed in 2008 | = 5000 Unemployed in 2009

We hear a lot about the continually rising national unemployment rate (currently at 9.7 percent), but the recession isn't hitting each part of the country with the same severity. This is a look at the metropolitan areas with the highest and lowest unemployment rates in the country. If you're looking to start a new life somewhere, may we recommend Oklahoma City?

Thirteen metro areas with the highest rates of unemployment

DETROIT, MICHIGAN
POPULATION: 1,027,974
14.9%
2008 unemployment rate: 8.3%

RIVERSIDE, CALIFORNIA
POPULATION: 311,575
13%
2008 unemployment rate: 7.4%

PROVIDENCE, RHODE ISLAND
POPULATION: 1,600,836
12%
2008 unemployment rate: 7%

CHARLOTTE, NORTH CAROLINA
POPULATION: 2,338,289
12%
2008 unemployment rate: 5.8%

PORTLAND, OREGON
POPULATION: 2,159,720
11.6%
2008 unemployment rate: 4.9%

SAN JOSE, CALIFORNIA
POPULATION: 7,354,555
11.2%
2008 unemployment rate: 5.3%

SACRAMENTO, CALIFORNIA
POPULATION: 3,091,120
11.1%
2008 unemployment rate: 6.3%

LAS VEGAS, NEVADA
POPULATION: 1,865,746
11.1%
2008 unemployment rate: 5.7%

LOS ANGELES, CALIFORNIA
POPULATION: 12,872,808
10.7%
2008 unemployment rate: 6.3%

TAMPA, FLORIDA
POPULATION: 4,000,000
10.6%
2008 unemployment rate: 5.3%

CHICAGO, ILLINOIS
POPULATION: 9,581,747
10.5%
2008 unemployment rate: 6.1%

LOUISVILLE, KENTUCKY
POPULATION: 1,268,321
10.2%
2008 unemployment rate: 5.1%

ORLANDO, FLORIDA
POPULATION: 1,896,311
10.2%
2008 unemployment rate: 5.2%

Thirteen metro areas with the lowest rates of unemployment

OKLAHOMA CITY, OKLAHOMA
POPULATION: 1,362,027
5.7%
2008 unemployment rate: 3.6%

SAN ANTONIO, TEXAS
POPULATION: 2,031,445
5.8%
2008 unemployment rate: 4.1%

NEW ORLEANS, LOUISIANA
POPULATION: 1,134,029
6%
2008 Unemployment Rate: 3.4%

AUSTIN, TEXAS
POPULATION: 1,653,603
6.1%
2008 unemployment rate: 3.9%

WASHINGTON, D.C.
POPULATION: 5,300,000
6.2%
2008 unemployment rate: 3.5%

HOUSTON, TEXAS
POPULATION: 5,728,143
6.9%
2008 unemployment rate: 4.4%

VIRGINIA BEACH, VIRGINIA
POPULATION: 1,793,015
7%
2008 unemployment rate: 3.8%

DALLAS, TEXAS
POPULATION: 4,500,000
7.1%
2008 unemployment rate: 4.6%

PHOENIX, ARIZONA
POPULATION: 4,282,899
7.3%
2008 unemployment rate: 4.5%

PITTSBURGH, PENNSYLVANIA
POPULATION: 2,468,371
7.3%
2008 unemployment rate: 4.7%

BOSTON, MASSACHUSETTS
POPULATION: 4,111,548
7.5%
2008 unemployment rate: 4.1%

DENVER, COLORADO
POPULATION: 2,126,516
7.5%
2008 unemployment rate: 4.1%

BALTIMORE, MARYLAND
POPULATION: 2,448,316
7.6%
2008 unemployment rate: 4.1%

UNEMPLOYMENT AROUND THE COUNTRY

— A COLLABORATION BETWEEN GOOD AND GAVIN POTENZA —

http://awesome.good.is/transparency/web/0908/trans0809joblessinthecity.html

Supergraphics – The Last Word

- "[Tufte] and I disagree. He thinks people are a lot smarter than I do. He likes packing a ton of information into a slide and letting people tease it out (same as the Napoleon graph in his first book). I go in the opposite direction. **If you can get the info across at first glance, you win**." - Seth Godin

Closing Thoughts

Displaying Data and Information: What is the Point?

- **Connect with the audience**
- **Direct audience's attention**
- **Promote understanding and memory**

Connect With the Audience

- **Principle of relevance**
  - Do not give too much or too little information
- **Principle of appropriate knowledge**
  - Avoid concepts, jargon, and symbols that can not be easily explained in the display

Direct Audience's Attention

- **Principle of salience**
  - Make sure perception is reality
  - Use formatting to highlight the differences you want readers to focus on
- **Principle of perceptual organization**
  - If you want elements grouped in a particular way, do it yourself don't leave it up to the reader

Promote Understanding and Memory

- **Principle of informative changes**
  - Be intentional about formatting
- **Principle of capacity limitations**
  - Be careful with supergraphics

Resources

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Terra Schehr

Assistant Vice President for Institutional Research and Effectiveness

Loyola University Maryland

tschehr@loyola.edu